Information Management Self-Assessment FY98

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September 1998

Executive Summary

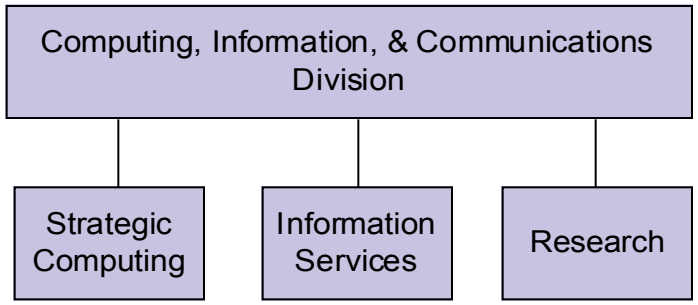
Background

Information management (IM) activities at Los Alamos National Laboratory have been consolidated in the Computing, Information, and Communications (CIC) Division. The mission of CIC Division is to provide reliable, efficient, state-of-the-art computing and communications resources and information services for the Laboratory's many and varied activities. Virtually every Laboratory organization depends on the availability of these critical resources and services to meet programmatic obligations, support day-to-day operations, and manage information. CIC Division is responsible for providing the computational support for a broad spectrum of modeling and simulation activities, developing and operating administrative information systems, developing a world-class library without walls, implementing modern records management systems, and communicating programmatic and research successes to the external community.

CIC Division must provide a modern, effective information system so that the Laboratory can run its business efficiently. Los Alamos has become a leader in information science and technology in both scientific applications of high-performance computing and in business applications of advanced computing, communications, and networking. The goal of CIC Division is to provide Los Alamos managers and staff with an improved computing and communications capability to capture, manage, and access information faster and more effectively.

During the past year, many changes have occurred at the Laboratory. John Browne became the Laboratory's director, and Charles Slocomb was appointed director of CIC Division. Charlie has considerable experience in CIC Division having held the positions of deputy director and group leader for Operating Systems. Because of the size and complexity of the division, Charlie has reorganized it into three branches, each led by a deputy division director (see organization chart below).

New CIC Division
Organizational Structure



The strategic computing environment is composed of networking, storage, and computing hardware and software that are on a scale sufficient to address critical national problems. This area is responsible for the innovative evolution of network, storage, and computing technologies aimed at a 100-teraOp capability.

The research area in CIC Division will encompass applied computer science, numerical techniques for large-scale and time-critical simulations, problem-solving environments for advanced architectures, and information sciences.

The information services environment must ensure that information resources and tools are coherent, electronically available, and readily accessible. This area must implement innovative technology to acquire current and archival information. While the other two segments of the division primarily have a "science and technology" orientation, information services gives us a focal point for business operations. Elevating our information activities to the deputy-division-director level gives both DOE and UC an influential contact within CIC Division for day-to-day interactions and for coordination of the Laboratory's business management oversight and Appendix F functions.

Performance Characterization

Building upon the successes of the past few years, the IM program at Los Alamos had a banner year in FY98. Several new initiatives have been undertaken that appear to have great promise, and many of our existing projects continue to show very favorable results. Our working relationships with both DOE and UC continue to be very successful. The willingness to share ideas and information, to assess past experiences and future directions, and to work together on problems has resulted in a true IM partnership.

One item that is particularly noteworthy this year is the collaboration that occurred among representatives of the UC Office of the President, the DOE field offices at Albuquerque and Oakland, and the three UC laboratories (Los Alamos, Livermore, and Berkeley). These six organizations met to revise the Performance Objectives, Criteria, and Measures (POCM) document for IM. The results were a reordering of the criteria in the Appendix F report in order to better emphasize results and a clarification of the gradients and assumptions for those criteria (see comparison table). The understanding and cooperation exhibited at these meetings were very encouraging. As a result, Los Alamos volunteered to utilize the new and improved format a year ahead of schedule and to work with DOE and UC on any potential refinements. The new format is what you will see in this document—the results are up front. Performance-based management can and will thrive in this environment.

Comparison of the FY98 and FY99 POCMs

FY98	FY99
Criterion 1.1: Strategic and Tactical Planning (Weight = 20%) Performance Measure 1.1.a (Weight = 20%) Planning Initiatives	Criterion 1.1: Operational Effectiveness (Weight = 30%) Performance Measure 1.1 (Weight = 30%) Operational Effectiveness
Criterion 1.2: Self Assessment Program (Weight = 25%) Performance Measure 1.2.a (Weight = 25%) Self Assessment Program	Criterion 1.2: Customer Focus (Weight = 30%) Performance Measure 1.2 (Weight = 30%) Level of Customer Satisfaction
Criterion 1.3: Information Management Program Results (Weight = 55%) Performance Measure 1.3.a (Weight = 25%) Level of Customer Satisfaction Performance Measure 1.3.b (Weight = 30%) Operational Effectiveness	Criterion 1.3: Effective Internal Controls and Compliance (Weight = 20%) Performance Measure 1.3 (Weight = 20%) Internal Controls and Compliance Process Management
	Criterion 1.4: Strategic and Tactical Planning (Weight = 20%) Performance Measure 1.4 (Weight = 20%) Planning Initiatives

Criterion 1.1 of the report, Operational Effectiveness, provides numerous examples of the results we have achieved in IM at the Laboratory. Because we have been involved in the Appendix F effort for a few years, we are starting to see positive trends in several of our projects. Desktop Computing, Information Architecture, the Library without Walls, and the financial stewardship of our IM activity continue to be highly effective. In this section, we also review the progress we've made in two areas crucial to IM—networking and data storage. Several new projects—the Xerox collaboration, LOCATES, and the Help Desk—are also highlighted. A new initiative within an existing project, DOE Directives on Explorer, has received very positive reviews and is described. And finally, a prestigious international award from the Society of Technical Communication was bestowed upon our Communications Arts and Services Group for their design of the CIC Division annual report—you will see the cover of their award-winning entry!

As evidenced in Criterion 1.2, much has been accomplished in the area of customer satisfaction. During the past year, we have evolved from merely measuring customer satisfaction to utilizing an integrated system for enhancing customer relations. This system dovetails very nicely with our Integrated Management Process (IMP) and our efforts to measure division activities against the Baldrige criteria. Our customer satisfaction measurements remain high, and our relationship with our largest high-performance computing customer (X-Division) has dramatically improved. In fact, this year's External Review Committee report cited CIC Division's improved relationship with X-Division as a significant and noteworthy accomplishment. This was the result of considerable effort in CIC Division and is a major accomplishment for us.

Criterion 1.3 of this report, Effective Internal Controls and Compliance, is commonly referred to as the "self-assessment" section. In it we discuss previously identified issues of noncompliance and other areas of interest that we and DOE have agreed to include. This year, we are happy to report that there are no noncompliance issues in the IM area. Our report includes a discussion of the Laboratory's Year 2000 (Y2K) efforts, our records inventory, and our implementation of printing and publishing directives. As you are aware, assessment is an integral part of CIC Division's Integrated Management Process (IMP), and we take it very seriously. In addition to our Appendix F assessment, we vigorously solicit, analyze, and act upon input from our advisory committee, employees, and customers to improve our products and services. To supplement these efforts, we completed our second Malcolm Baldrige internal assessment and spent four days working with Mark Graham Brown, a nationally recognized performance measurement expert, on enhancing our performance measures. These activities are also described in this section.

Finally, our strategic and tactical planning efforts are described in Criterion 1.4. CIC Division's IMP is the foundation upon which all of our strategic and business planning activities are built. It is in its third year of implementation, and it is actively supported by our leadership team. The IMP provides continuity in the face of organizational change. Despite changes in upper management within the Laboratory and CIC Division, the principles of strategic and business planning, total quality management, and performance measurement upon which the IMP is founded have been institutionalized and endure.

The support that we have received in IM from our counterparts at DOE and UC has been outstanding for the past several years—FY98 was no exception. This support, coupled with a sound planning process, a customer focus, and demonstrated achievement, has enabled Los Alamos to do an outstanding job of Information Management.

Performance Objective #1—Information Management (IM) Program

The Laboratory manages information resources on a corporate basis to improve the quality of its products, to add value to scientific programs and customer services, and to improve the Laboratory's work processes.
(Weight = 100%)

Criterion 1.1—Operational Effectiveness

The IM program provides cost-effective products and improved services. (Weight = 30%)

Performance Measure 1.1—Operational Effectiveness

Evaluation of measurable improvements in cost-effective operations. (Weight = 30%)

Assumptions

Measurement deliverable—description of the information management program's accomplishments which have resulted in measurable improvements in the provision of cost-effective products and services. The description may be accomplished through reference to accessible work products or other existing Laboratory documentation.

"Operations" means the delivery of products and services.

Gradients

Good—examples that demonstrate measurable improvement and cost-effective, IM services and products

Excellent—demonstrated results that contribute to institutional cost-efficiencies, savings, and improved operations.

Outstanding—external recognition of operational effectiveness or benchmarking that indicates best-in-class performance.

Performance Measure Results—FY98 Highlights in Computing, Information, and Communications

The majority of Information Management (IM) activities at Los Alamos are consolidated in the Computing, Information, and Communications (CIC) Division. The goal of CIC Division is to provide cost-effective products and services that enable our customers to accomplish their work effectively. Virtually every Laboratory organization depends on the availability of these resources in order to run its business efficiently. The IM umbrella at the Laboratory is very large and covers many disciplines. In this section, we highlight the achievements of several groups and projects in CIC Division that demonstrate the Laboratory's commitment to improving the quality of its IM products, to adding value to scientific programs and customer services, and to improving work processes. The IM projects are discussed in the following order:

- Desktop support for the Laboratory
- Help desk services
- New customer service telephony system
- Network operations
- Adstar Distributed Storage Manager (ADSM™)
- LANL/Xerox knowledge management system

- LOCATES
- Library without Walls
- Explorer
- Information Architecture
- IM financial management
- Technical communication awards

As evidenced by the breadth of these highlights, much has been accomplished in the area of information management during the past year.

Desktop Support for the Laboratory

Several aspects of the division's support for Lab-wide computer operations resulted in both cost savings and improved service for customers. Better, more cost-effective service resulted from negotiating site-wide licenses for software, from automating desktop management, and from lowering the cost of desktop support.

Electronic Software Distribution

Electronic Software Distribution (ESD) has three components: Lab-wide software licensing, user software purchasing and registration, and software downloading/installation. This year ESD offered over 700 products at significant discounts—prices even lower than can be offered through the Lab's "just in time" software contract. Working with the vendor, we negotiated site licenses with individual software providers. In the first seven months of FY98, purchases of software through ESD saved the Laboratory over $2.0M. These savings resulted from almost 27,000 licenses and more than 60,000 software downloads.

Users can purchase and register software via the ESD Web site, which is maintained by our Remote Electronic Desktop Integration (REDI) team. This site gives users product and price information for each software package offered. As with best-in-class retail Web sites, users can add ESD software to their "shopping carts" and then purchase it with valid Los Alamos Charge information. They then have two options for downloading their new software: they can either download it to their desktop as a bundled package for installation, or they can request our "network installation" service. Unbundling software requires a lot of disk space and is time-consuming; network installation allows users to bypass the need to stage and unbundle the software before installing it on their desktop.

During FY98, the REDI team focused on expanding the software provided through ESD. Part of this work included developing a systematic approach to obtaining Laboratory-wide site licenses and volume discounts for standard software identified by the Laboratory's Information Architecture Project. In the past, site discounts for software such as the Sun UNIX operating system (SunOS and Solaris), the Macintosh operating system (MacOS), and the Web browser (Netscape) were informally negotiated with vendors. FY98 savings also resulted from the option given to Lab staff last year to purchase maintenance contracts for their software that would provide new releases at significant discounts. Table 1.1-1 compares the total savings in software licensing costs for the Laboratory over the last four years.

Table 1.1-1: Software Licensing Savings

Product/Company	Savings (in thousands of dollars) FY95	FY96	FY97	FY98
Microsoft Select	–	–	1,300	1,520
Netscape*	97	228	400	290
Macintosh OS/Apple**	13	441	80	–55
Sun OS	564	560	545	560
Sun Compilers	91	91	475	91
SGI OS/Silicon Graphics	–	–	42	20
OnNet-PC/TCP/FTP Software	375	300	344	100
Eudora e-mail/Qualcomm	–	–	330	250
Lotus Notes	62	30	14	0
Meeting Maker/On Technology	–	–	60	112
Jetform	5	181	290	182
McAfee (VirusScan, NetShield)	–	–	–	100
Symantec (NAV,SAM, Utilities)	–	–	–	97
Adobe (Acrobat, Exchange)	–	–	–	47
TeInet	–	–	–	22
HyperSnap	–	–	–	22
Claris (FileMaker, HomePage)	–	–	–	18
Other***	–	–	57	33
TOTAL	1,207	1,831	3,937	3,409

Notes: *FY98 savings are those realized before the product became free.
**The loss posted for FY98 reflects the fact that we just signed an agreement for maintenance through May 2000 and have not yet realized any savings.
***Includes WS_FTP, Fetch, Darkside, Cleansweep, DataViz, and FWB.

System Management Server (SMS)

This year the REDI team also developed a service that provides automated management of PC and Macintosh desktop systems. Called SMS, this service also has three components: software and hardware inventory, software delivery and installation, and remote management. The software and hardware inventory provides information about what services a given desktop can use and what capacities are available (such as disk space and memory). Automated software delivery and installation enables us to add and update software without requiring user time and expertise for its installation. It also allows us to make changes to the Los Alamos software environment in a timely and coordinated manner. A good example would be deploying the latest virus detection and repair software to all desktops when a new virus has entered the computing environment. Finally, remote management allows a system administrator to assist users and do routine maintenance without being present at their desktops; such remote maintenance also saves time and improves efficiency.

This year we piloted the SMS service on 200 desktops and began offering it to customers. During the pilot study, we learned many things about how the service should be targeted for maximum user satisfaction. We also identified areas to address, such as server authentication and domain naming. Our goal is to install the service on 2,000 desktops in FY99.

Desktop Support Cost

Desktop computer support at the Laboratory is primarily negotiated through annual contracts and delivered by full-time technicians who are assigned to a customer organization and work at the customer's site. To determine the cost per desktop for this support, we divide the cost of a contract by the total number of desktop systems being supported. This average cost per desktop ranges from about $340 per year for customers who have standardized hardware and software to $2,100 per year for customers with specialized equipment and servers. Based on FY98 data for 77% of our support contracts, the average number of desktops supported per technician was 89, resulting in an average

cost per desktop of $1,150 per year (see Table 1.1-2). Data gathered by the Gartner Group indicates that the industry-wide average for desktop support is $1,020 per desktop per year.

Table 1.1-2: Comparison of Desktop Support Metrics

Support Metric	FY96	FY97	FY98
Percent of contracts reported	10%	54%	77%
Desktops per technician	55	73	89
Cost per desktop	$1,670	$1,250	$1,150

The FY98 data represent an improvement over FY97 performance: in FY97 technicians averaged only 73 desktops at an annual cost of $1,250 per desktop. The FY98 cost reduction is attributed to increased efficiency from the use of electronic system and network management tools and wider use of new operating systems, such as Windows 9.x and MacOS 8.x. This cost reduction was not comparable to the technicians' gains in productivity because of rising staffing costs. Desktop support and local-area-network administration are a very competitive field, and our salaries for support staff had to increase substantially to remain competitive. However, we expect the cost per desktop to drop further as a more extensive network management infrastructure, including the SMS service described above, is rolled out to the Laboratory.

Help Desk Services

The CIC Customer Service Center serves all Laboratory computer users, both internal and external users. The center provides consulting, training, and validation services for the Integrated Computer Network (ICN) and offers a central point of contact for users when they encounter problems working at their desktops, accessing and using ICN machines and services, or looking for resources on the Internet.

Last year brought dramatic changes within the Customer Service Center that involved personnel, help desk support tools, operational processes, training, and our awareness of national standards. We reached a full complement of qualified personnel to support the major areas of computing at the Laboratory (desktop, network, scientific, and enterprise). We implemented a customer call-tracking system through Remedy and a state-of-the-art computer telephony system. We modified some of our processes to make operations more efficient and focused. Finally, we created and implemented a group-wide training program, and we adopted national norms for evaluating our help desk services. The effect of these changes has been to increase the center's capabilities and importance and move it toward becoming a unified, measurable, and profitable unit within the Laboratory. The changes have also pushed our group closer to becoming a nationally competitive help desk.

The Customer Service Center is composed of seven teams:

- ICN—serves the scientific, large-machine, large-storage, and ASCI community
- Desktop—supports Macintosh and PC desktop users
- Customer Support—meets Internet, network, and integrated technology needs
- Labwide—supports users of the Lab's enterprise systems (travel, time and effort, property, authorities, etc.)
- Training—offers instruction for enterprise systems, networking, the Web, and high-level computer areas
- Password Office—provides ICN passwords or SmartCards
- External Clients—helps customers outside the Laboratory who use our computing resources

This past year, all teams reached the full complement of personnel required to meet the present needs of the user communities they support. Further increases in personnel are now being pursued to address the rapidly increasing needs of these communities.

All teams whose services are phone-based (i.e., all except training) now use our call-tracking and telephony systems. This is the first time that the teams have been so coordinated in their processes. This uniformity is allowing us to gather an extensive base of metrics that are both descriptive of our users (e.g., problems encountered and answers given) and of our operations (e.g., number of phone calls, e-mail messages, faxes, and walk-ins). Such data will increase our ability to evaluate user and service trends. We are now working on developing ways to convey this information to division personnel.

Service center operations have become more automated and unified. Although in the past, various teams have used Remedy (a database for recording user problems) by customizing its usage to their individual needs, we are now creating a common Remedy schema that will be used by all teams. Our new telephony system has given us full local control over phone menus, on-line announcements, instant fax reception and transmission, automatic routing and recording of e-mail messages, and development of phone call routing to meet spur-of-the-moment situations. With this increase in technology, we now see other processes that can be automated.

We have adopted a new training program that has two parallel paths: the first path is common to all teams; the second is team-specific. The goal of the first path is to develop a common base of knowledge, skill, and fluency about the Laboratory computer environment and its users. Training on this path focuses on communication skills, personal development, customer service, and teamwork as well as on fundamental knowledge in networking, desktop computers, software, hardware, and system administration. The goal of the second path is to develop and maintain the technical knowledge needed by each team. For example, the desktop consultants are pursuing national certification in NT environments, while the training team is pursuing evaluation of their classes through a professional qualification system.

Finally, team and group managers have become more aware of national standards for help desks through involvement with such organizations the Software Support Professionals Association (SSPA) and HelpDesk International (HDI). This interaction has provided comparative data on the common metrics and norms for our operations and has cultivated a desire to excel in these operations.

New Customer Service Telephony System

A major accomplishment this year for the CIC Customer Service Center was the implementation of a highly sophisticated computer telephony system. This system subsumes all telephone functions, redirecting telephone, e-mail, fax, and Web interactions to a centralized, computer-based Enterprise Interaction Center (EIC).

Marketed by Interactive Intelligence Inc. of Illinois, the EIC is a client/server software product that turns a Windows NT server into a comprehensive communications system for call centers and help desks. EIC allows organizations to manage all internal and external interactions on a single NT server with tight integration to other software packages, including Exchange, SQL Server, and IIS. It is a multithreaded, Java-based engine that can process thousands of interactions per hour, such as telephone calls, e-mail messages, faxes, Internet chats, Web call-back requests, and voice-over-net sessions.

We began implementing this system about a year ago with the purchase of an industrial-quality Windows NT server. The system was used during early winter on the PCs in the Customer Service Center. During the winter and spring, we worked closely with EIC developers in Illinois to design and test the Java interface for the client software. The interface was finished this summer and enables all of the computers in our service center to become clients: Macintoshes, PCs, Suns, and SGI Origins.

With a telephone headset plugged into their computer, our consultants can now see all interactions directed to them (see Fig. 1.1-1). Highlighting a single interaction, they can respond through their headset or with the keyboard. One of the first EIC capabilities used was to send faxes with the click of a button. For example, to a user seeking information about logging in to the ICN, the consultant can instantly respond by clicking a window entry on the screen to send the person a fax of the user guide for ICN log-ins. The EIC system will have already accessed the Employee Information System and retrieved the user's identification information, including his or her fax number.

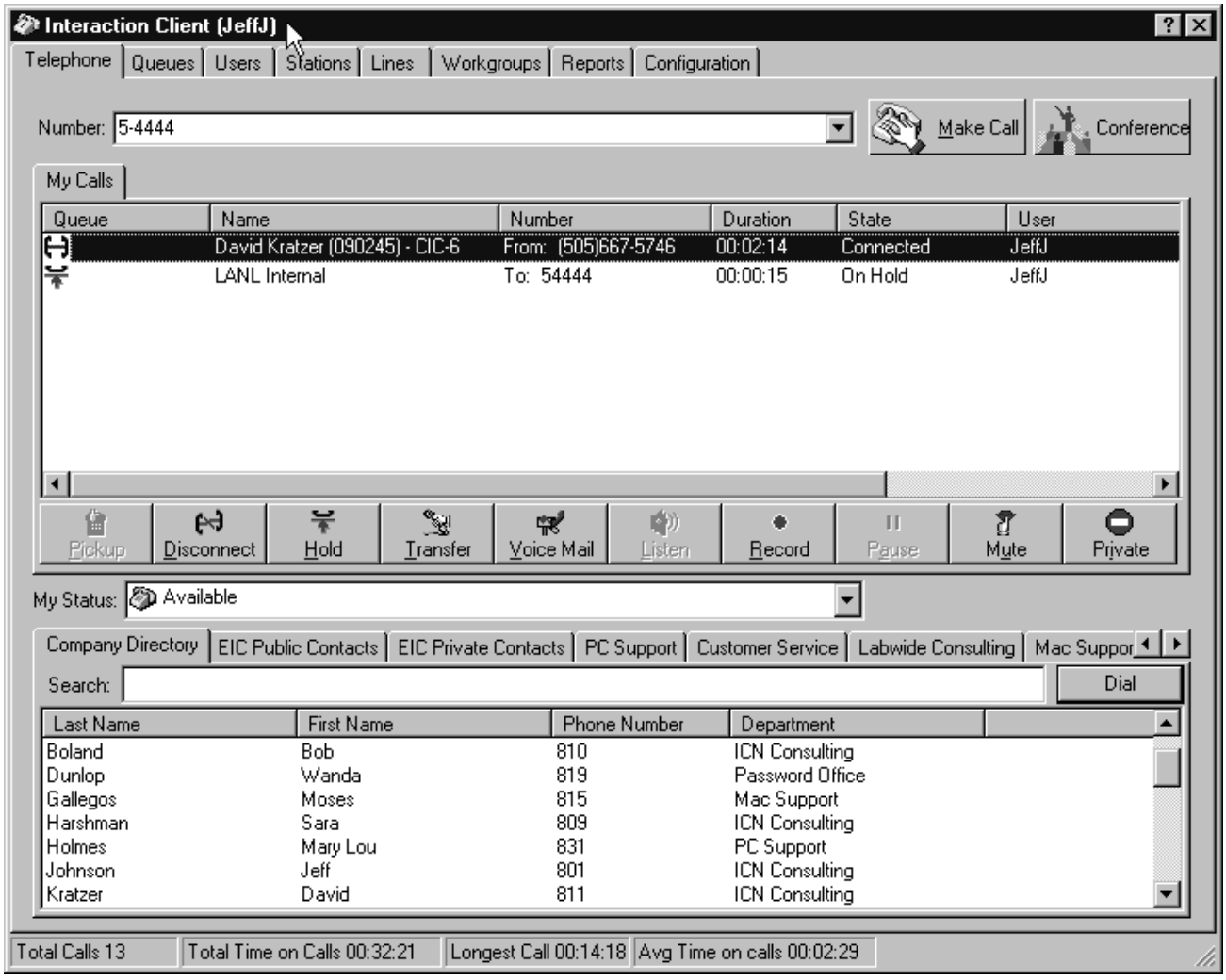


Figure 1.1-1. Consultant's computer screen for the new telephony system: the consultant (JeffJ) is talking to a caller (highlighted interaction in queue) and has placed a phone call but put it on hold (LANL Internal). The names listed at the bottom of the screen are those of other consultants. Jeff could transfer his active call to any one of these consultants by simply dragging and dropping the highlighted interaction on the consultant's name.

The EIC system also includes a graphical application that allows us to develop interaction processes by selecting icons rather than writing whole new computer codes. Proof of the system's versatility came when we designed and implemented an easy means of obtaining a Laboratory SmartCard, which generates single-use-only passwords for accessing computer networks. We used the graphical application to create a series of voice menus that asked a caller for input, returned information to the caller for verification (in computer-generated and consultant-recorded voices), and then compiled the information in a file. The new request process takes about one-third the time of the previous method and results in a queued list of SmartCard requests. The whole process was designed, tested, and implemented in about 20 hours of work and has not failed. We received requests within an hour of launching the process.

In tandem with our trouble-call tracking system in Remedy (a database for recording customer interactions), the telephony system substantially improves our response to customer needs. It automates message queuing and e-mail distribution, allows us to quickly create messages and post them to phone numbers, generates operational metric reports, enables us to create new processes to handle special situations such as the SmartCard requests, and gives us local control over all avenues for customer interactions with our service center. The CIC Customer Service Center is one of only a few in the country to use such a multiplatform communication system.

Network Operations

Los Alamos has an extensive computer network that interconnects all Laboratory sites. Given the nature of the research at Los Alamos, extensive work has gone into building a high-performance, reliable backbone network to support all user requirements, from PCs to the high-end supercomputers used by the Accelerated Strategic Computing Initiative (ASCI). Lab computers are interconnected with a variety of network links geared to their needs.

Standard Ethernet links operating at 10 megabits/second are used for most PCs. However, this baseline network is quickly being upgraded to Fast Ethernet links running at 100 megabits/second. There is also a Laboratory-wide effort called LANL-Net that will upgrade all network wiring to the new CAT-5 standard that supports Fast Ethernet links. In addition, the Laboratory's supercomputers use a new high-end network technology called the High-Performance Parallel Interface (HIPPI), which operates at 800 megabits/second, 80 times the speed of the standard Ethernet links.

The backbone network is where all the computer traffic over these links converges. Figure 1.1-2 shows the aggregate network bandwidth for the backbone over the last two and a half years. As shown, backbone traffic has quadrupled from close to 100 gigabytes/day in late 1995 to over 400 gigabytes/day in May 1998. If this growth rate continues, the backbone will reach its capacity in two or three years. All indications are that network traffic will grow at least this much, if not more. Consequently, we are evaluating new network technology such as the asynchronous transfer mode (ATM) and Gigabit Ethernet as potential upgrades for the backbone.

Through projects like LANL-Net and the ongoing efforts of Los Alamos network engineers, we continue to provide the highest bandwidth possible to serve the needs of all users of the Laboratory's computer network.

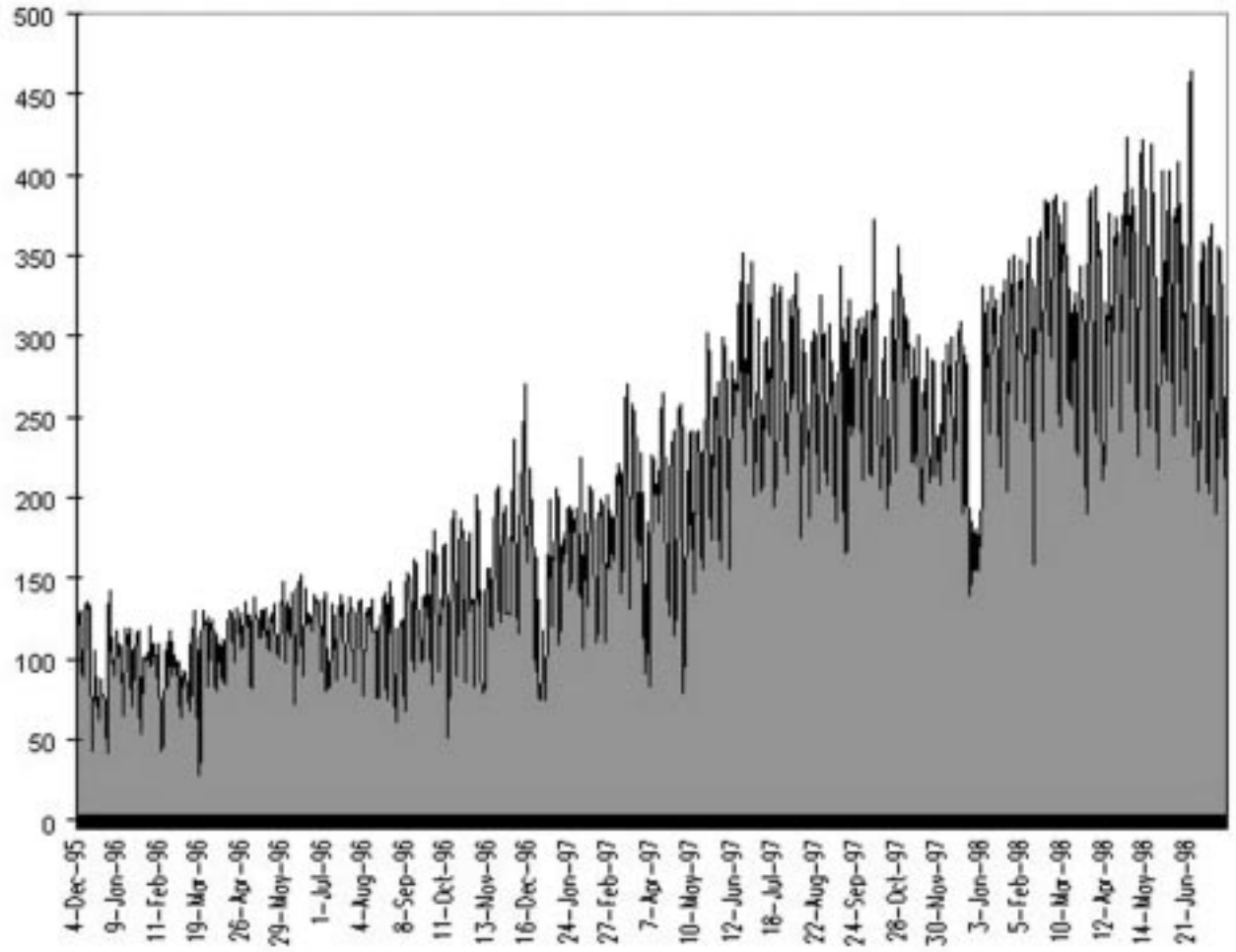


Figure 1.1-2. Computer traffic over the Lab's backbone network has steadily increased. The two significant dips in traffic—around 23-Dec-96 and 23-Dec-97—correspond to when the Laboratory was closed for the holidays.

Adstar Distributed Storage Manager (ADSM™)

ADSM™ is an integrated distributed hardware/software system from IBM that backs up desktops and servers to both disk and tape storage for disaster recovery. ADSM has provided nightly backup and file storage service for the Laboratory's open computer network since October 1996 and for the secure network since October 1997. It supports all the desktop platforms at Los Alamos, including PCs, Macintoshes, and UNIX workstations. In addition, ADSM backs up servers such as the network file system and distributed file system and is used to back up the local disks of the ASCI supercomputers. This range of client support demonstrates ADSM's versatility at Los Alamos; use of ADSM is limited only by the constraints of the operating system communicating with it.

As a vital link in the Integrated Computing Network (ICN) and Laboratory Disaster Recovery Management system, ADSM plays a key role in information management at Los Alamos. Without it, thousands of workstations would require alternative backup solutions for disaster recovery and hundreds would just not be backed up, or would be backed up far less frequently. Likewise, the Laboratory's archival storage systems—the older common file system (CFS) and new high-performance storage system (HPSS)—would have to be reengineered to deal with the backup workload that ADSM now handles.

As implemented at Los Alamos, ADSM has been able to meet rapidly increasing demand for backup service with minimal increases in hardware and support personnel. In less than two years of service, ADSM has grown to nearly 100 million files and 10 terabytes of data. In FY98 alone, ADSM usage increased by 50%. Figures 1.1-3 through 1.1-5 chart the increasing demands placed on ADSM from August 1997 to July 1998.

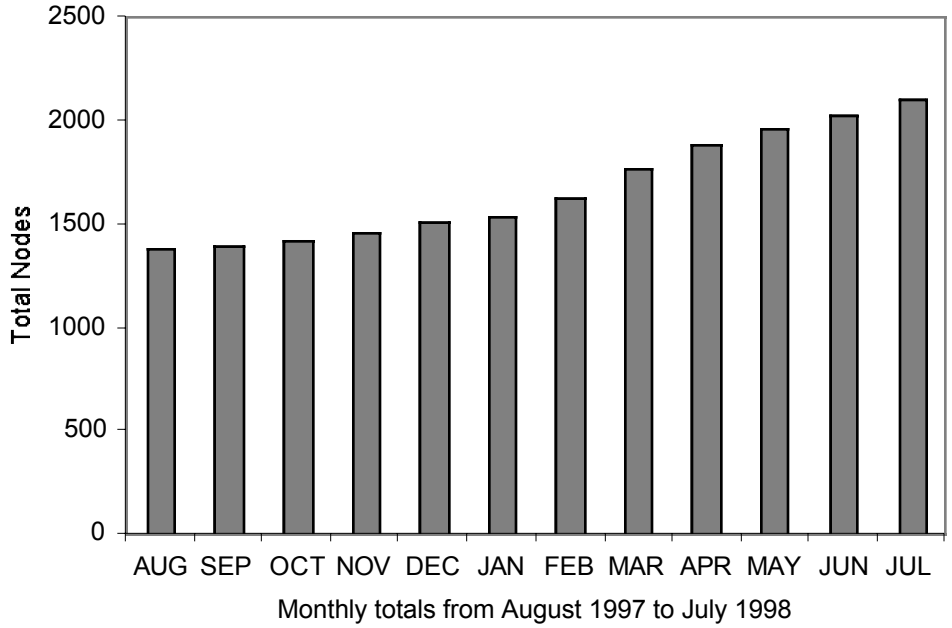


Figure 1.1-3. Steady increase in ADSM client registration.

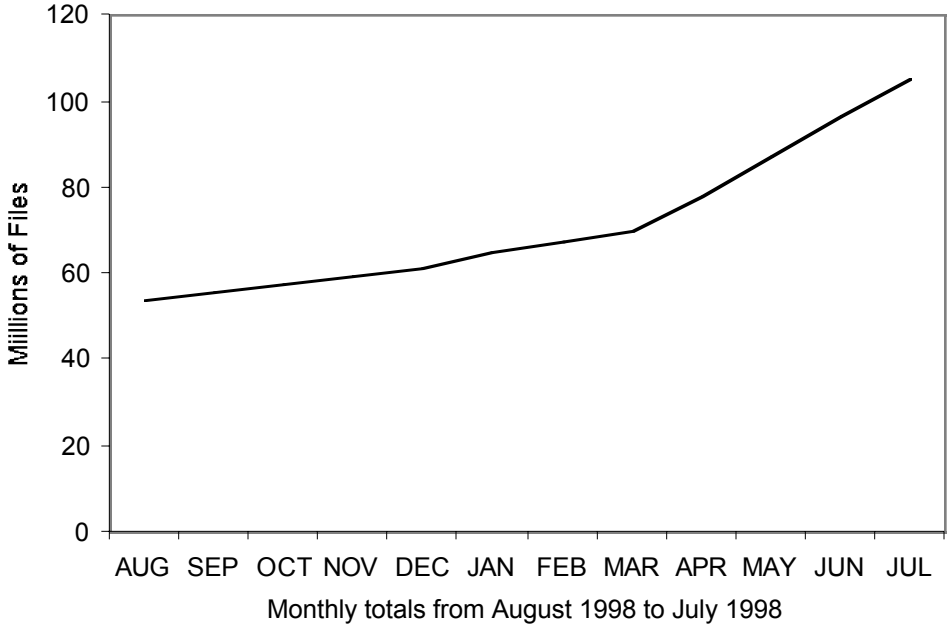


Figure 1.1-4. Increase in the total number of files in the ADSM database.

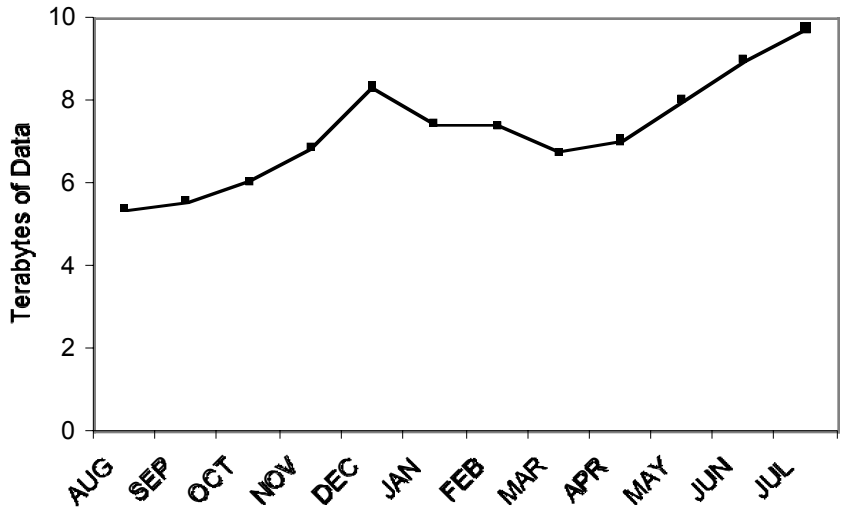


Figure 1.1-5. Increase in the amount of raw data in ADSM. The deviations from linear growth reflect the addition of one or more virtual servers to the system.

To meet the growing demand for file backup service, we have found several ways to leverage our existing resources. We currently have one ADSM server machine running in the secure network and three in the open network. However, by adding two to three CPU cards to our open network servers plus some additional memory, we are able to run at a capacity equivalent to five ADSM servers on these three physical machines. Normally, licensing and hardware costs for adding an ADSM server would be about $100K, whereas the cost of adding CPU cards and memory is about $10K each. And we have been able to operate the virtual servers without experiencing any loss in efficiency. To manage the virtual servers from a single terminal, we have also developed a Web-based multiserver administrator. Finally, we have developed ways to share expensive peripheral devices, such as tape libraries, robotics, and tape and disk drives, again without any loss in efficiency. Significant savings—on the order of $28K per virtual ADSM server—come from sharing our digital linear tape (DLT) libraries.

The key strategic guidelines followed in our ADSM multisystem design have been

- scalability, with inexpensive, incremental, and well-analyzed additions to the system;
- highly efficient utilization of expensive resources (such as magnetic disks, robotic tape transports, and server system CPU);
- low incremental cost of device, media, and operations management of the server environment; and
- extremely low incremental cost to the entire ADSM infrastructure per additional client due to the leveraging of resources.

LANL/Xerox Knowledge Management System

On July 14, 1998, Los Alamos and the Xerox Corporation signed a CRADA (cooperative research and development agreement) to develop a state-of-the-art knowledge management system for the Laboratory. The system will be used to provide weapons and production information essential to the Lab's science-based stockpile stewardship mission.

This five-year project will follow a phased approach. Early phases will develop a system to handle legacy data; later phases will focus on ways to manage the flow of information, such as transferring knowledge from current to future generations of weapons scientists and engineers.

The Central Weapons/Production Information Center (CWIC) was identified as the first Lab organization to benefit from using the system that is being developed through this collaboration. CWIC is responsible for managing over 24 million pages of weapons-related documents, including over 1 million aperture cards, 3 million radiographs, and other records on various media types. The project will eventually expand to include weapons records located throughout the Laboratory by establishing links to currently independent systems. Long-term, the goal is to link the Los Alamos knowledge management system to similar systems throughout the DOE complex for the efficient exchange of information.

During this first year of our partnership with Xerox (following the signing of a letter of intent in December 1997), we laid the project's foundation. Accomplishments included

- meeting with customers and sponsors to identify user requirements and prioritize information needs and media types,
- documenting system requirements based on customer input and identifying funding models for short- and long-term needs,
- developing the system architecture for document capture,
- identifying and beginning to implement initial infrastructure requirements, which include modifying a current facility (SM-39) to house the new system and store the project's large collection of documents, and
- documenting (1) the condition of current records and media types that must be handled by the new system and (2) the archiving attributes required to ensure timely retrieval of information by a diverse set of users.

In early FY99, we expect to complete the first-phase modifications to our SM-39 facility and relocate the CWIC team and its weapons records to the facility. Upon completion of the first phases of the knowledge management system architecture, we will purchase equipment and set up a prototype system in SM-39. Initial tests will involve processing aperture cards.

LOCATES

The LOCATES system was developed in FY98 to replace the Laboratory's classified record system—CARLA (computer-assisted retrieval at Los Alamos)—with a more advanced one that would be Year 2000 compliant. LOCATES has been operational for unclassified documents since March 1998. A modified version of LOCATES, called CLOCS, is being developed for classified documents. CLOCS will largely reuse all the existing components of LOCATES, plus it will have a few new features to support the unique requirements of classified records.

In general, LOCATES allows us to scan, code, and store documents. In addition, it provides

- electronic access to Laboratory records,
- integration between departmental and Laboratory records,
- interoffice collaboration,
- e-mail integration,

- integrated security, and
- the ability to track both documents and actions related to them.

The design goal was to use off-the-shelf components and customize their integration to provide a simple user interface. The system architecture is built around a Documentum/Oracle database, a Lotus Notes interface, and Adobe Acrobat for document scanning and display.

LOCATES provides the Laboratory with a large-scale document management, distribution, and workflow system. It provides tools for scanning paper documents, for entering both electronic documents and descriptive information about them into the system, and for searching documents. In terms of distribution, it provides the means for logging and routing documents to offices and individuals both within and outside the LOCATES system. Finally, in terms of document workflow, it includes tools for assigning, completing, and tracking work to be done on documents. The intended audience of LOCATES is the Records Management Group (CIC-10), senior Lab management (e.g., the Laboratory Director's Office), and departmental offices (e.g., division, group or program offices).

LOCATES includes a large document repository with highly customizable security such that permission to read or edit documents is handled on a document-by-document basis. The imaging tools use optical character recognition to convert scanned documents to portable document format (PDF) files for retrieval and to place documents in a database for full-text searches. A few of the more important capabilities of LOCATES are described below.

Paper Document Entry
For CIC-10, the primary requirement of LOCATES was to scan and add meta data (i.e., descriptions of the data being stored) to the large volume of paper documents (~1000 pages) that arrive at the Laboratory each day. The LOCATES system thus includes a large-volume scanning station and multiple meta-data entry stations. Once a document has been both scanned and coded (i.e., its meta data has been entered), the system automatically converts the document into a PDF file. The PDF file then appears in a Lotus Notes in-mailbox from which it can be electronically forwarded to any office or individual.

For departmental offices, a simpler document entry system is used that combines scanning and coding. This system allows any departmental office to scan documents, add meta data, and receive the PDF file. Each office has its own in-mailbox where the documents arrive and from which they can be distributed.

Searches
A comprehensive search engine is available that enables both searching via key words in documents (i.e., content searches) and searching via meta data through millions of documents. The search engine guides new users in how to perform basic searches. However, it also allows more knowledgeable users to do searches with multiple Boolean operators in order to quickly retrieve the exact document(s) they need.

Document Distribution
Any document in LOCATES can be sent to other LOCATES users in much the same way as one sends e-mail, except that the sender has control over whether the recipients receive the original document or a copy and whether they have read-only access or can edit the document. To people outside LOCATES, the system automatically sends an e-mail message with a copy of the document included as an attachment.

Electronic Document Entry
Documents that have been created electronically (e.g., by word-processing, illustration, or engineering drawing tools) can also be placed in LOCATES. These user-created documents are stored by the user in a departmental repository. In the near future, users will also be able to send their documents to the

Records Management Group for review and, if approved, for inclusion in the official Laboratory archive.

Task Creation and Tracking
Another capabiliy that will soon be operational involves creating and monitoring tasks that assign document-related actions to one or more people. LOCATES provides the means for describing and assigning such tasks, for tracking progress on them, for issuing automatic reminders associated with impending due dates, and for closing tasks. As part of LOCATES, users will have their own tasklists (an e-mail-like interface), where they can work on any task assigned to them, assign tasks to others, create new documents in support of a task, or search for any document in the repository.

Library without Walls

Special research libraries are shifting their focus from expanding physical collections housed in buildings to incorporating digital information access, which is bounded neither by walls nor by book and journal collections. In a library without walls, customers use computer technology to access a wealth of digital information sources worldwide—at any time and from anywhere. Our Library without Walls Project complements the mission of the Los Alamos Research Library by providing worldwide, 24-hour access to a broad range of digital library resources.

The short-term goal for the Library without Walls Project is Web delivery of information to researchers' desktops from digital library resources. Its long-term goal is creation of a network of knowledge systems that facilitate collaboration among researchers. This past year the project moved closer to both goals by offering the new or expanded services described below.

SciSearch® at LANL
SciSearch® at LANL is an international, multidisciplinary index to the journal literature of science and technology. The database, which covers 5,200 journals, contains 16 million citations from 1974 to the present; 18,000 citations are added weekly. This past year, the database was expanded to include

- over 650,000 electronic journal articles hyperlinked to the database as PDF files;
- 200 million cited references (twice as many as last year); and
- 95 million active hyperlinks (twice as many as last year).

To help researchers keep pace with the explosion of scientific publications, we also developed a customized "alerts" service. Weekly Alerts is an automated means of tracking the contents of specific journals or tracking articles on particular research subjects. Users create individual profiles (customized search strategies), which are then checked against the 18,000 citations added weekly to the database. New items matching a user's profile automatically generate an e-mail notice of the articles of interest. New citations to papers can also be tracked using this service. Researchers can be notified when others cite their papers, or they can be notified when an important paper in their field is cited.

Citations flagged by the service can be quickly compared with the Research Library's holdings to determine if the needed volume is in the collection. Researchers can also mark a number of citations they are interested in downloading and then download them all at once in various formats. Once a list of citations has been downloaded, it can be printed, saved to a file, or electronically mailed to a colleague.

Because the Library without Walls Project was designated by the DOE and the Laboratory as a User Facility, we can partner with external customers in delivering digital library services. As a result, the project is now providing access to SciSearch® at LANL to the following institutions:

- University of New Mexico
- Stanford University
- Sandia National Laboratories

- Phillips Laboratory
- New Mexico State University
- New Mexico Institute of Mining and Technology

BIOSIS® at LANL
To support the life sciences, the project put the BIOSIS® at LANL database on the Web for Laboratory researchers. (Stanford University has also contracted to use this database). The database contains citations, with abstracts, from Biological abstracts and Biological abstracts/RRM (reports, reviews, meetings). BIOSIS indexes approximately 6,500 journals and 2,000 meetings per year, as well as books and other materials. The database has been linked to over 200,000 electronic journal articles. BIOSIS® at LANL also offers unique links to HighWire Press articles (from Stanford University).

INSPEC® at LANL
The Library without Walls Project developed a Web interface to INSPEC® at LANL and has linked over 300,000 electronic journal articles to the database. INSPEC (Information Service in Physics, Electrotechnology and Control) is the leading English-language citation database for the world's literature on physics, electronics, and computing. INSPEC scans papers from approximately 4,200 journals, 1,000 conferences, and other publications. INSPEC corresponds to the print publications of *Physics Abstracts*, *Electrical and Electronics Abstracts*, and *Computer and Control Abstracts.* Subjects covered include astronomy, chemistry, computer science, engineering, earth sciences, mathematics, physics, and general/popular science.

Energy Science and Technology Database
The DOE Energy Science and Technology database (covering 1974 to 1997) was indexed and made available to LANL researchers via the Web. The database had previously been available only through commercial vendors; it is not available via the Web from any other source. It is a multidisciplinary database of 3.6 million records and contains worldwide references to basic and applied research literature. The database includes references to publications provided by the U.S. Department of Energy, its contractors, and other government agencies. It also includes information from the International Energy Agency's Energy Technology Data Exchange (ETDE) and the International Atomic Energy Agency's International Nuclear Information System (INIS). Approximately half of the references are from sources outside the United States.

Electronic Journals
Over 1,000 full-text, full-image journals are now available for authorized Los Alamos users through network connections—more than double the number available last year. We are collaborating with several publishers to provide electronic journals to the desktop as PDF files. Publishers working with us include Academic Press, Elsevier Science, the Institute of Physics, Springer-Verlag, and the American Mathematical Society. In addition, members of the New Mexico Library Services Alliance have joined our project and are cooperating in purchasing electronic journals. We are now beginning to develop browsing capabilities to these 1,000+ electronic journals.

Explorer

Explorer is a Web-based interface developed by the INDEX (institutional data exchange) team at Los Alamos. Explorer provides full-text search and retrieval for many databases, documents, and sites on the Web, including the DOE Directives, the LANL Administrative Manual, LANL Operational Requirements, LANL Nuclear Weapons Archive Project collections, the University of California/DOE Prime Contract for LANL, the Research Library’s SciSearch® at LANL database, and the Proliferation Information Network System. As a consistent, easy-to-use interface, Explorer simplifies access to many heterogeneous collections of information scattered throughout the Laboratory and the DOE complex. It also provides access to an online review and comment system (called RevCom), to Web crawling and indexing, and to document management applications such as Documentum.

DOE Directives on Explorer

The DOE Directives—regulations and policies governing operations at all DOE facilities—are now available on the Web through Explorer. Since we made them available on the Web two years ago, the directives have become one of the most widely used of all Explorer applications. Noteworthy achievements related to this application of Explorer include the following:

- The average monthly activity for the DOE Directives site has climbed to 20,000 visits and 130,000 searches per month (see Fig. 1.1-6).
- Over 2,500 users have registered for the site's automatic alert feature that sends them e-mail notices of new directives.
- By decreasing DOE's paper copies of directives by 80%, the Web site saved $355K in FY97; accumulated cost savings by FY2000 are projected at $1.4M.
- The joint DOE/LANL team responsible for DOE Directives on Explorer was awarded Vice-President Gore's National Performance Review Hammer Award, the DOE Energy Quality Award, and a DOE Information Management Gold Pin Award.
- Using the Web-based survey and metrics application developed at Los Alamos, the Directives management team at DOE-HQ has conducted extensive surveys of the entire DOE community for the Paperless Directives Pilot, Directives Sunset Review, Directives on Explorer Evaluation, and other similar initiatives.

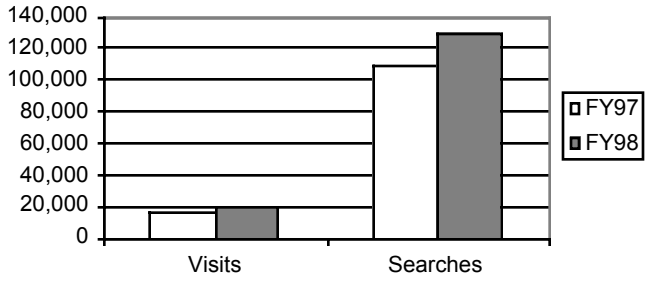


Figure 1.1-6. Comparison of average monthly activity for DOE Directives on Explorer in FY97 and FY98.

In the 1998 survey of users of DOE Directives on Explorer, more than 90% of those responding rated Explorer "good" to "excellent" (see Fig. 1.1-7). Most of the remaining 10% who rated Explorer "fair" to "poor" admitted that they did not use the system regularly.

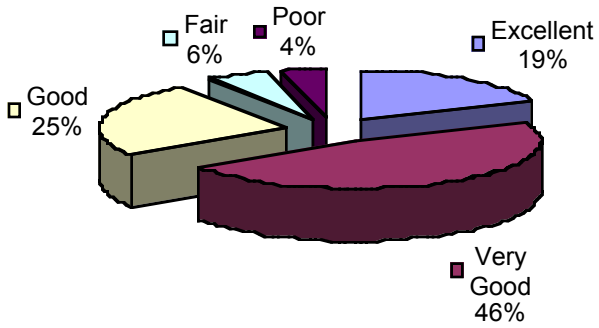


Figure 1.1-7. Survey results for 1998 on user satisfaction with DOE Directives on Explorer.

Online Review and Comment System
In the second quarter of FY98, we conducted the first DOE-wide beta test of the new Online Review and Comment System (RevCom) developed with Explorer. Subject-matter experts, contract administrators, managers, and order writers from over 50 DOE, management and oversight (M&O) contractor, and Laboratory organizations participated in the beta test. Immediately following this successful test, we implemented LANL RevCom for the Laboratory's Administrative Manual. To date, seven revisions of the manual have been put on RevCom for review and comment by all University of California employees at the Laboratory. Beginning in the first quarter of FY99, all draft documents of LANL Operational Requirements will be put on RevCom for review and comment by Laboratory personnel.

Since the successful testing and use of RevCom for DOE and the Laboratory, we have been approached by policy and directive coordinators at Nevada Operations, Oak Ridge Operations, and the Savannah River Site who are interested in installing and configuring RevCom for use at their sites.

Information Architecture

Since its inception in 1993, the Information Architecture (IA) Project has followed an inclusive, cross-divisional approach to adopting Laboratory standards for computer software, hardware, networks, security, and information practices. By establishing a "band of coherence" within which users can enjoy improved information sharing and more-focused support, the project has increased technical productivity, reduced overall costs, improved network security, and encouraged the use of interoperable technologies throughout the Laboratory.

During FY98, the IA Project continued to be highly productive, attentive to emerging technologies, and responsive to customers. Our standards development process remained open and participatory, enhancing customer understanding of and support for the standards. Concurrently, we expanded the scope of our work to address new issues, such as the need to prepare for Year 2000 (see Criterion 1.3), the increasing use of Microsoft NT networks, the emerging need for laptop hardware standards, and the ongoing need for an overall protection model for unclassified electronic information.

As shown in Fig. 1.1-8, we continued to address the Laboratory's most pressing needs by maintaining our focus on key activities of continuing importance while shifting our focus when goals were fulfilled and new needs emerged.

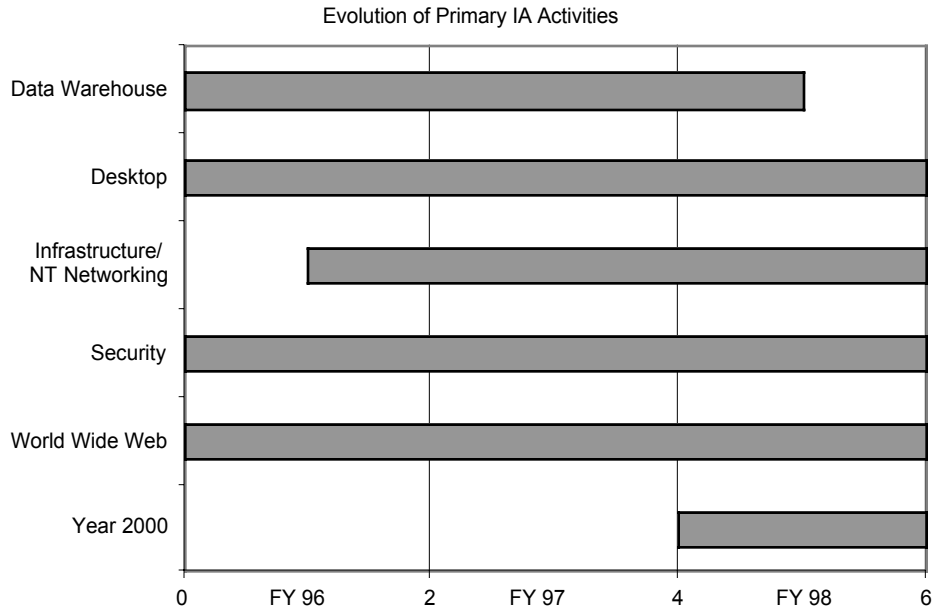


Figure 1.1-8. The IA Project has adapted to meet evolving Laboratory needs.

Not every area we investigate is ready for standards. The Data Warehouse area, for example, required ongoing work from September 1994 until April 1998 before the requisite understanding and consensus were in place to implement standards. The Desktop area, by contrast, adopted its initial hardware configuration standards in July 1995, but it took until this fiscal year before the team could expand the hardware standards to include laptop computers and desktop computer manufacturers.

Regardless of the time it takes to develop new standards, however, we have continued to expand our base of Laboratory standards for selecting and using computer and information technologies. As shown in Fig. 1.1-9, new standards continue to be adopted, existing standards are upgraded as needed, and old standards are retired when no longer applicable. This process of standards evolution requires ongoing attention to technological changes, awareness of Laboratory needs, collaboration with support and training groups, and responsiveness to customer input.

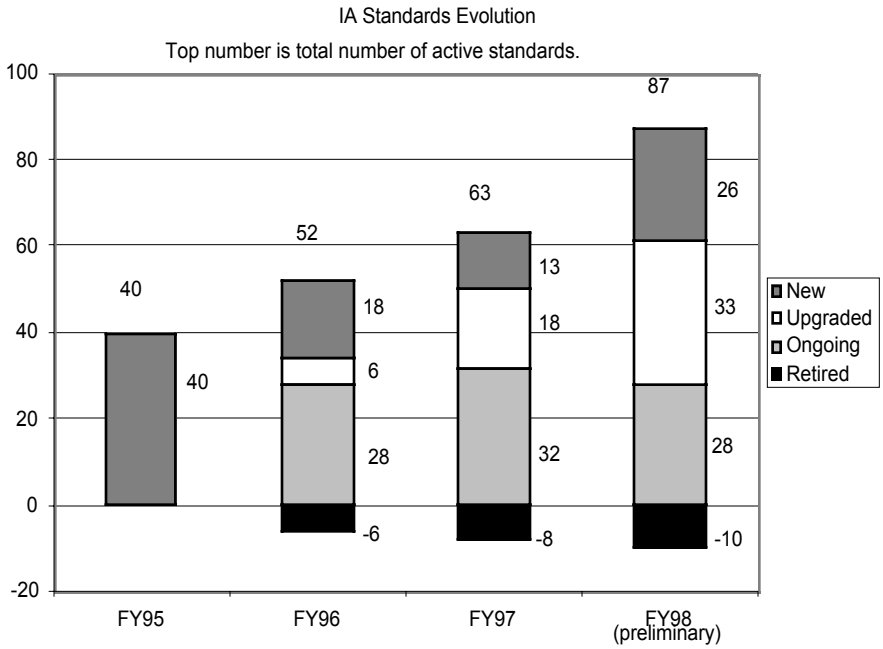


Figure 1.1-9. The number of IA standards has steadily increased even as the standards themselves have evolved to address changes in the technologies covered.

As they are adopted, IA standards form the foundation for other computing and information services. As shown in Fig. 1.1-10, a number of CIC service groups are able to focus their efforts on products, technologies, and practices adopted as IA standards. Enterprise application developers, for instance, can target their applications to standard hardware and software. Similarly, training and support staff can target standard products, network services can target standard protocols, and network security can focus on a standard security model.

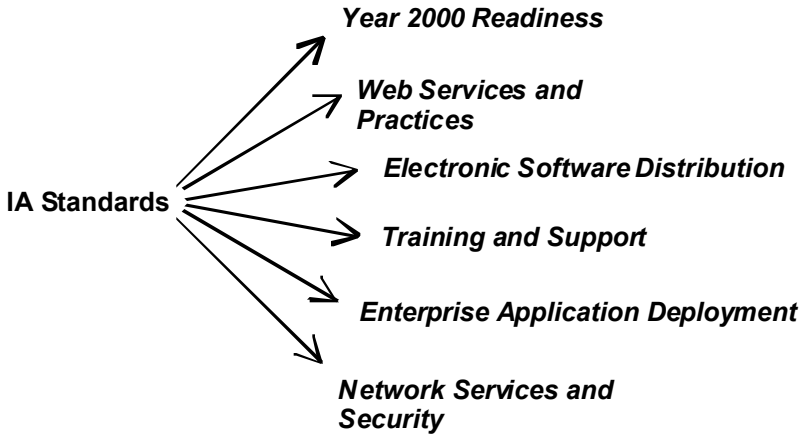


Figure 1.1-10. IA standards provide a foundation for many CIC Division services.

The effectiveness of IA standards is most easily measured by Laboratory use of standard software. As shown in the customer satisfaction section of this report (see Criterion 1.2), our FY98 survey indicates that overall adherence to IA software standards remains strong, above 90% in many cases, in spite of the fact that we do not have any direct means of enforcing those standards.

Another measure of our project's effectiveness is the sustained activity of our Web site (see Fig. 1.1-11). While there are clearly cyclical variations, each quarter's activity has been consistently higher than the corresponding quarter of the previous year in terms of both the number of hits and the number of visitors.

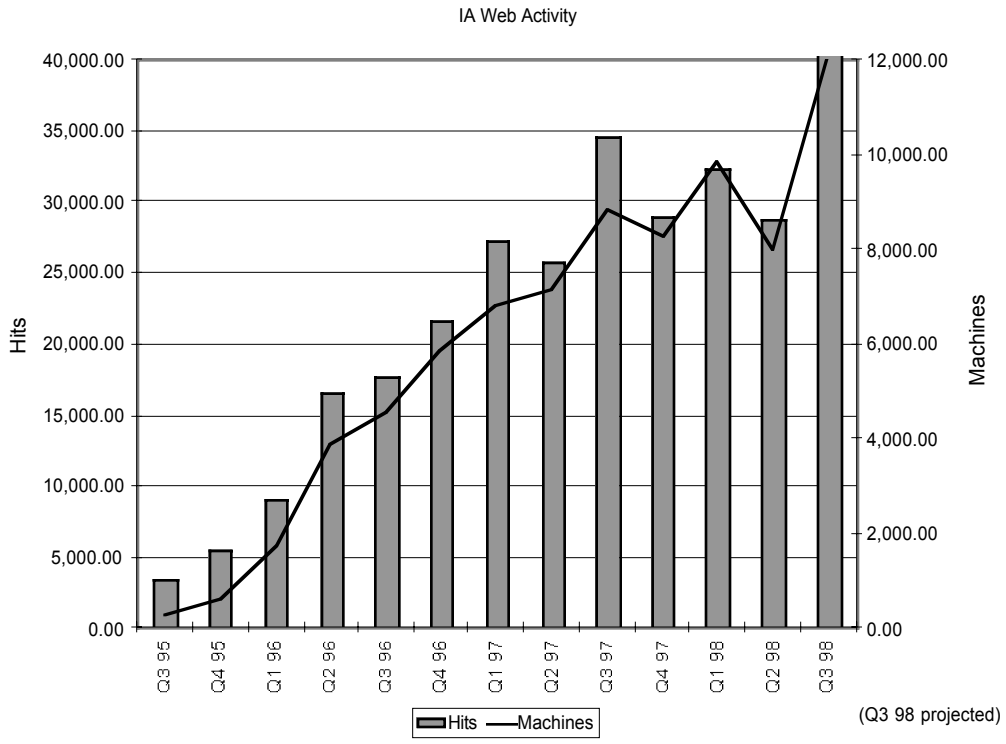


Figure 1.1-11. IA Web site activity continues to rise; machine statistics reflect the number of visitors to our site.

In the following list, we highlight a few accomplishments of our primary activities during FY98 (through August). While not comprehensive, these accomplishments demonstrate why the IA Project continues to far exceed expectations in terms of productivity, responsiveness, and effectiveness.

Data Warehouse

- Final standards were adopted for the Enterprise Administrative Data Warehouse, including those for client-server access, Web-based access, and direct access by other applications.
- The need for an "open views" data warehouse was identified from customer input, and a model for it was developed.

Desktop

- An advisory was issued on the risks involved with moving to Windows 98.
- Software and hardware standards were upgraded, including an upgrade to Microsoft Office 97/98.
- Software standards were expanded to support other IA teams, including standards for Web authoring and encrypted logins (proposed).

- Hardware standards were expanded to include laptop configurations and standard PC and Macintosh manufacturers.
- Collaboration with ESD, CIC-6, and UNM-LA continued to ensure availability, support, and training for IA standard products.

Infrastructure/NT Networking

- A Microsoft Networking Forum was held for a packed audience, with live broadcasts via Labnet and the Web. Participants included a Microsoft consultant on-site and a Gartner Group consultant who participated through a video teleconference link.
- A standard was adopted for Microsoft NT naming conventions.
- A white paper on Microsoft networking at the Laboratory was published on the Web for comments.

Security

- Earlier standards were expanded to define four "protection regimes" ranging from unrestricted dissemination to robust authentication, authorization, and encryption. The unclassified electronic information regimes give information owners a framework for determining appropriate protection levels.
- The standard Unclassified Network Security Model was completed with the addition of network file system security.
- The standard protocol suite was expanded to include security protocols needed to implement the standard Unclassified Network Security Model.
- Advisories were issued on security vulnerabilities affecting e-mail, Web browsers, and other widely used software.

World Wide Web

- New standards were established for Web authoring and for Web republication of journal articles written by Laboratory employees.
- Standards were upgraded to reflect advances in technology and opportunities for improvements in performance (e.g., HTML, HTTP, image formats).
- Articles on Web accessibility, emerging technologies (e.g., XML), and other issues affecting Web authors were published in *BITS*.

IM Financial Management

The budget process within CIC Division starts with management establishing the division's strategic and tactical goals and their sustaining tactics for the fiscal year. This is done through an exchange of information—usually through presentations, business plans, and dialogue—as to the specific goals, opportunities, and estimated resources for CIC's varied groups and projects. Budgets are then developed according to the requirements of the funding mechanisms for CIC's diverse service portfolio—from support services such as writing, editing, photography, and video production, to institutional services such as telecommunications and network services, to the scientific and technical research involving high-performance computing.

CIC Division is complex from a financial viewpoint because it is one of the largest divisions in the Laboratory and because it receives all six types of funding:

- G&A (General and Administrative) Budget/Allocation
- Organizational Support
- Institutional Recharge
- Direct Recharge
- Direct Programmatic and Reimbursable
- LDRD (Laboratory Directed Research and Development)

Each type of funding has its own procedures and requirements. The division's varied funding profile requires constant vigilance with respect to budgeting and spending funds. Nevertheless, we ended FY98 well within our target; that is, we were not more than 1% over or 5% under our overall allocation/revenue (see Table 1.1-3).

Table 1.1-3: CIC FY98 Budget Overview, showing Allocations and Revenue by Funding Category

G & A ($M)		Organization Support		Institutional Recharge ($M)		Direct Recharge ($M)		Direct Programmatic/ Reimbursable ($M)		LDRD ($M)	
LANLnet	$3.10	Division Rate	6.00%	Network	$7.63	Desktop	$5.17	NWT	$50.00	LDRD	$0.46
Library Services	$8.15	Composite	22.26%	Telecom-	$28.63	HPC	$6.85	LER	$11.50		
ACL	$0.30	Group Rate		munications		CTI	$0.13	DoD &			
Records Mgmt	$3.80	Overall	28.26%	Facilities	$1.98	C/S	$1.09	External	$13.50		
LANLWeb	$0.19	Composite		Mgmt		Comm.	$10.88	Other			
Enterprise Info Sys	$7.32	Rate				Printing	$1.42	Programs	$9.36		
						O/E	$0.84				
						P/V	$1.79				
						Nirvana	$0.45				
Total ($M)	$22.86		$23.51		$38.24		$28.62		$84.36		$0.46
Revenue ($M)	$22.86		$23.70		$41.12		$28.74		$98.43		$0.46
								Less FY98		Less 2.5%	
								Carryover	$3.59	Holdback	$0.01
									$94.84		$0.45
Costs ($M)	$22.83		$23.64		$41.04		$28.53		$93.32		$0.43
EOY Variance (%)	-0.11%		-0.26%		-0.19%		-0.71%		-1.60%		-4.19%

The G&A (General and Administrative) Budget/Allocation for FY98 covered a variety of division functions that are funded as part of Laboratory's overhead—for example, the Research Library, records management, and administrative computing initiatives. The FY98 G&A cost of $22.8M was about $26K under the division's allocation, which represents a favorable variance of 0.1% (see Fig. 1.1-12).

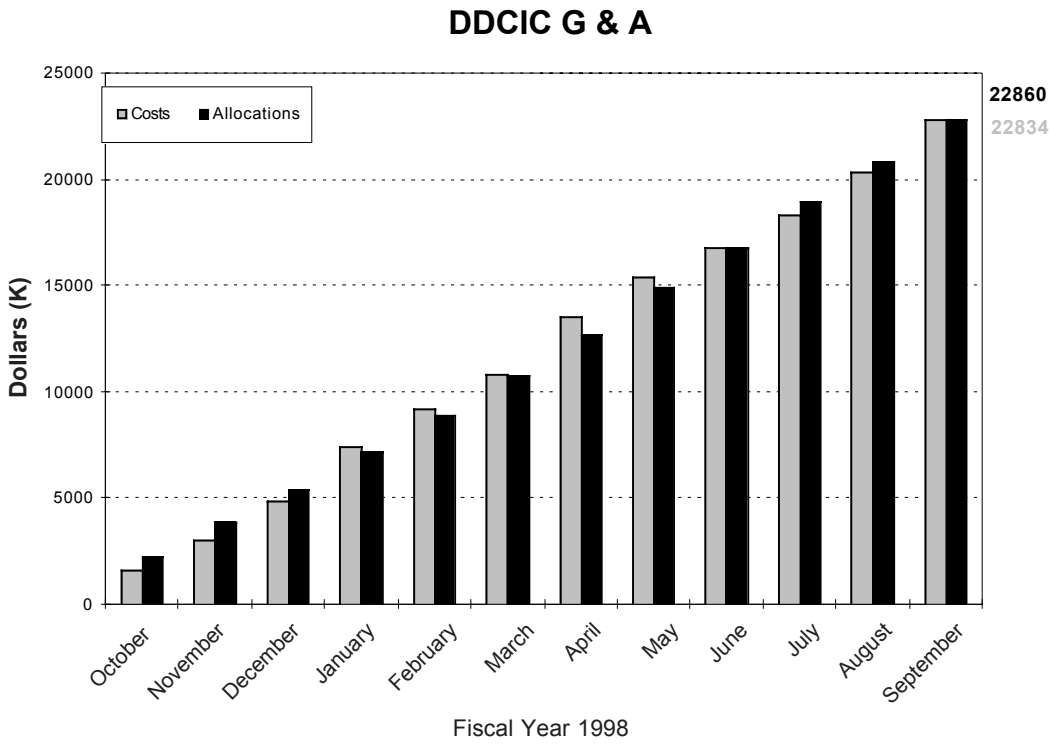


Figure 1.1-12. CIC FY98 budget for G&A.

Organizational Support represents funding that both the division and group offices collect in the form of a tax on their base costs. The funding is used to support division and group administration. The tax percentage varies by organization, depending on its size and tax base. The FY98 Organizational Support revenue of $23.7M covered division costs with an excess of only $60K, which represents a favorable variance of 0.3% (see Fig. 1.1-13). This small variance indicates that both division and group managers did an excellent job of managing their organizational support tax rates.

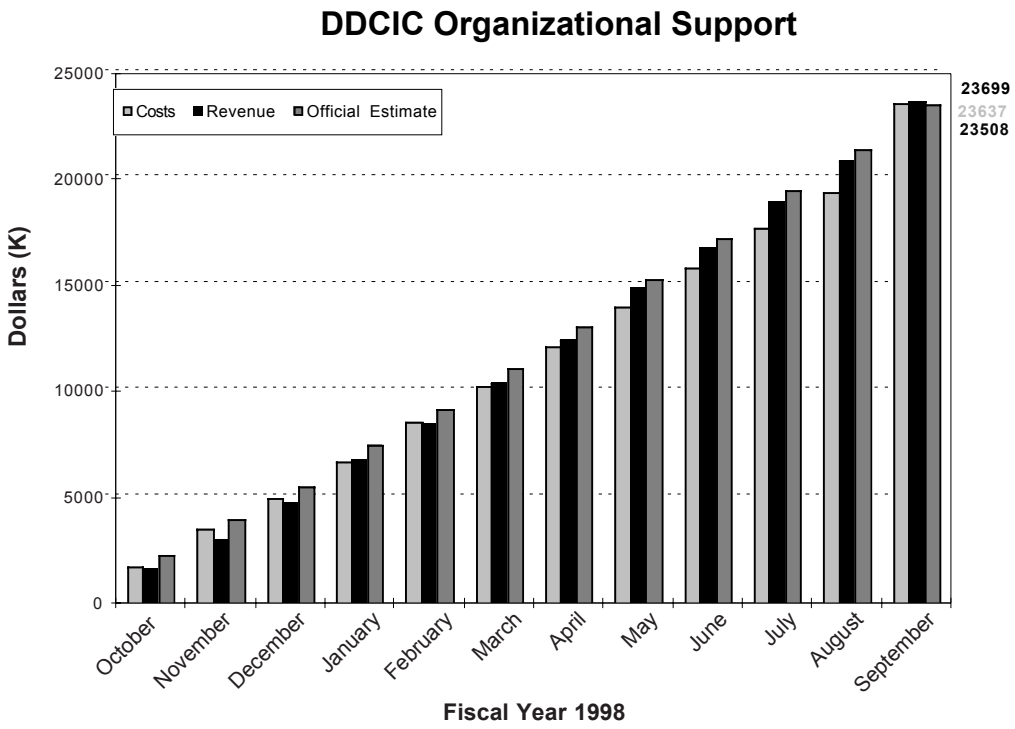


Figure 1.1-13. CIC FY98 budget for Organizational Support.

Institutional Recharge represents a pass-through of costs for CIC services that benefit the Laboratory as a whole. In CIC Division, this funding covers the telecommunication system, the computer network, and a portion of the costs for facilities management. In FY98, year-end revenue was a little more than $41.1M and the corresponding costs were $41.0M, which is a variance of less than $80K, or 0.2% (see Fig. 1.1-14). This small favorable variance indicates that we did an excellent job in setting our recharge rates.

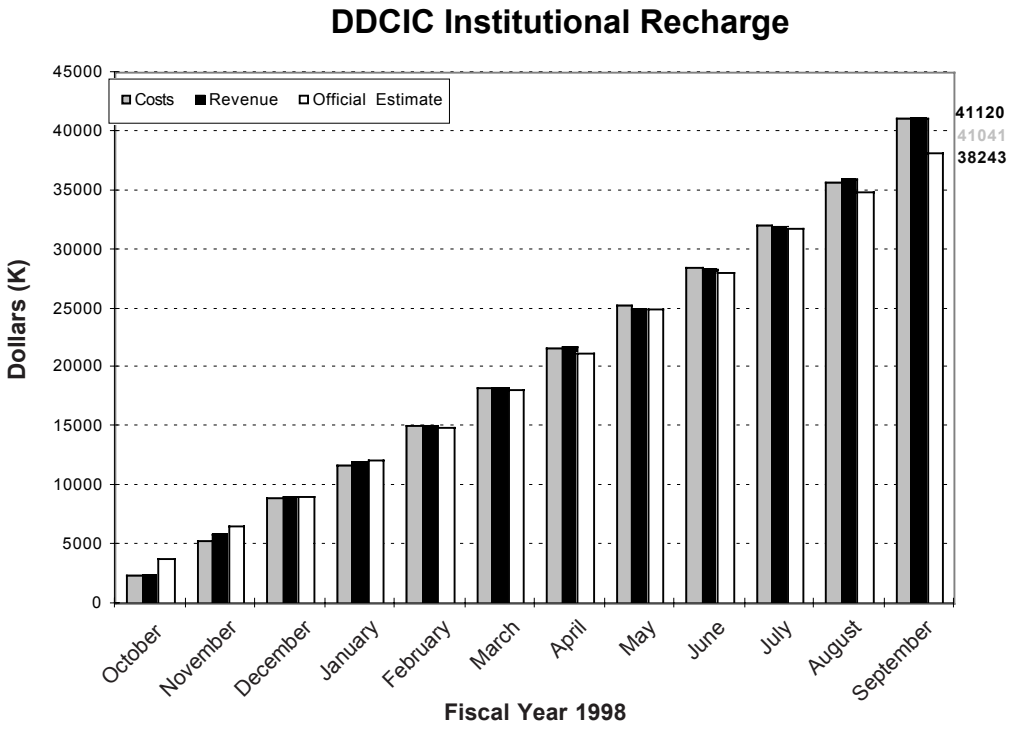


Figure 1.1-14. CIC FY98 budget for Institutional Recharge.

Direct Recharge is funding that covers the cost of providing internal services to specific Laboratory customers, including CIC groups. Covered by this category are the computing services we provide to the Weapons Program as well as to our own groups, such as Communication Arts and Services and Desktop Support. In FY98, our Direct Recharge costs were $28.5M and revenues were $28.7M (see Fig. 1.1-15). This represents a favorable variance of only 0.7%, which indicates that we did a good job of setting our recharge rates to cover only our costs.

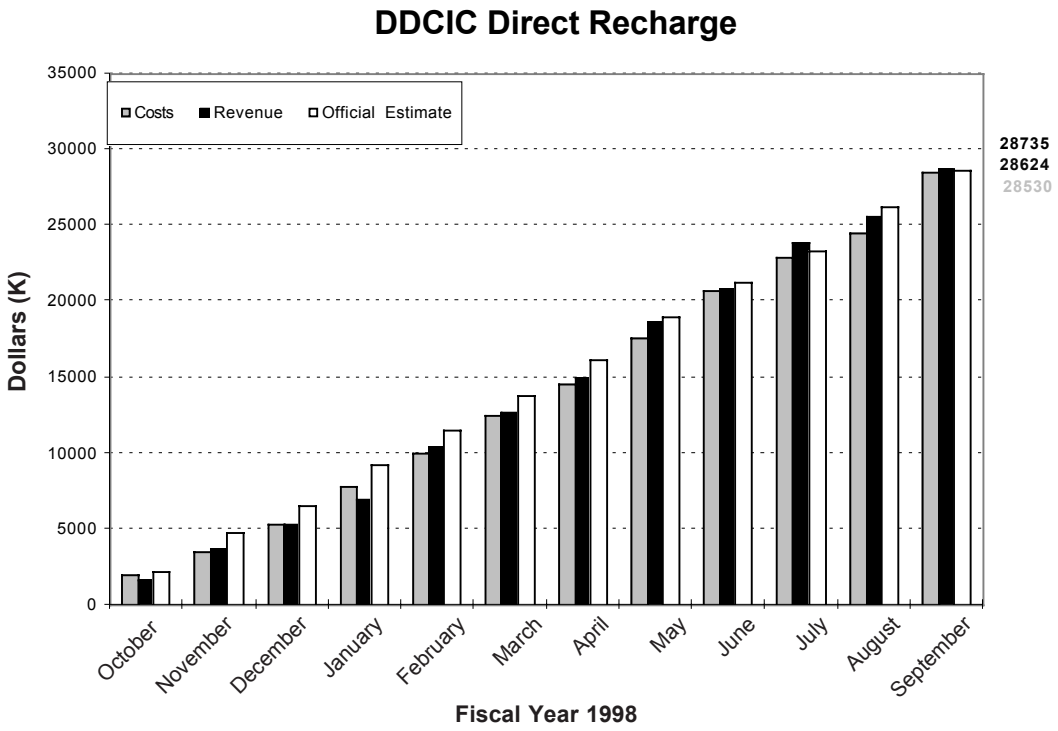


Figure 1.1-15. CIC FY98 budget for Direct Recharge.

Through allocations and suballocations from Laboratory program offices and other divisions, CIC Division receives Direct Programmatic and Reimbursable funding. For FY98, our division was allocated $98.4M, of which about $3.6M will be carried over to FY99. The net FY98 allocation of $94.8M was sufficient to cover the costs of $93.3M and resulted in a favorable variance of only 1.6% (see Fig. 1.1-16).

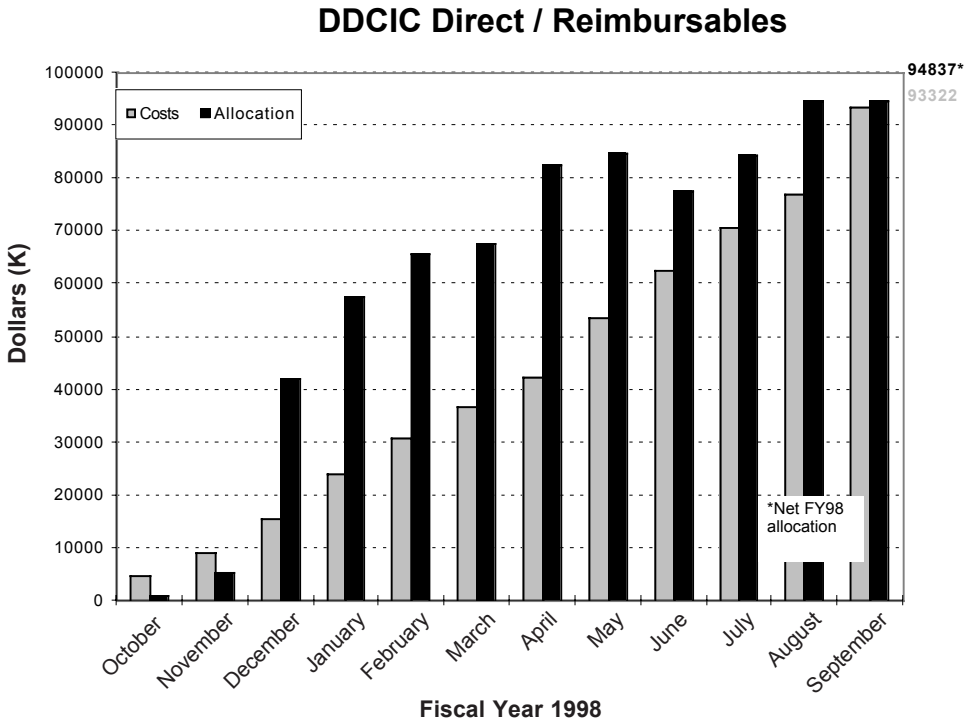


Figure 1.1-16. CIC FY98 budget for Direct Programmatic/Reimbursables.

LDRD (Laboratory Directed Research and Development) funding is an institutional allocation to be used specifically for research and development projects selected through a competitive process. The division received a total of $454K (97.5% of the total requested) in LDRD funding for proposals that we submitted to the LDRD office. Our costs were $435K, resulting in a favorable variance of 4.2% (see Fig. 1.1-17). We also received $967K in suballocations to assist in work on proposals from other divisions.

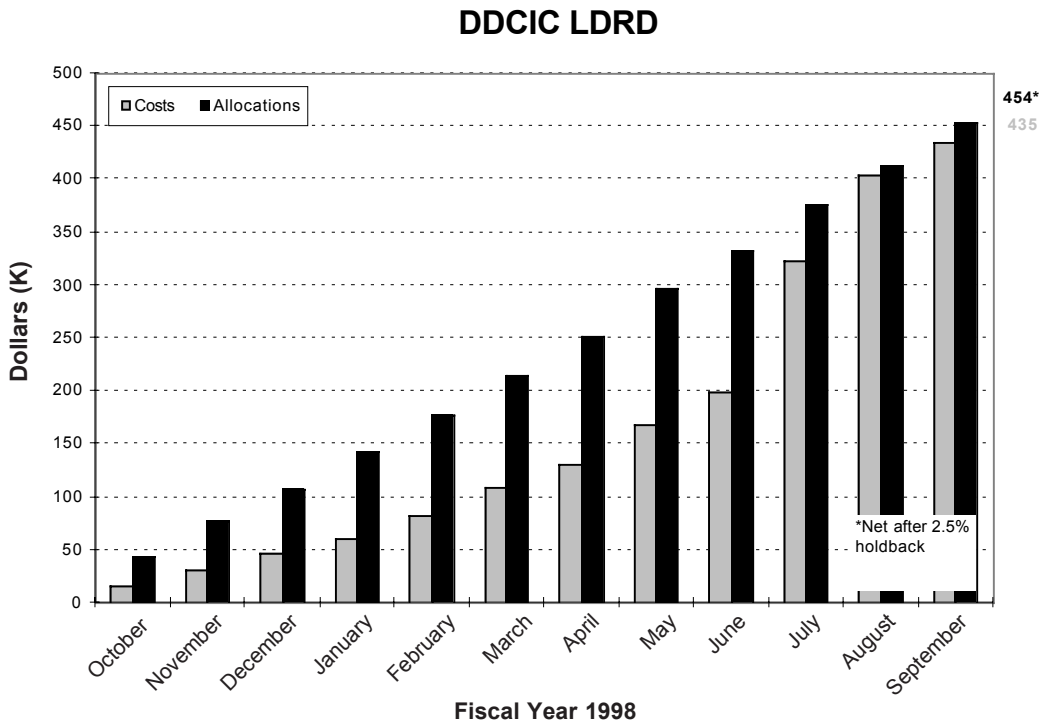


Figure 1.1-17. CIC FY98 budget for LDRD work.

CIC Division Savings for FY98

CIC Division achieved significant cost savings in FY98. The following list is just a sampling of those savings to demonstrate their nature and extent. Actual savings from these examples total more than $1.3M for FY98, and many will continue to save the Laboratory money in future years.

- The Telecommunications Group rebid its cellular equipment contract, not only shortening delivery time to its customers from 2–3 weeks to 2–3 days but also saving approximately $18K per month. Savings for FY98 could be as high as $75K and will continue through FY99.
- By deciding to go with Fast Ethernet switches on the ASCI machine, which do not require another Giga Switch, the Network Engineering Group saved approximately $75K. It saved up to $120K by choosing Linux network servers rather than the more expensive Sun Microsystem servers. The group also decided to deploy layer 2/3 switches rather than upgrade the Cisco 7500 routers; with 20 routers in the network, the potential savings through FY2000 could be as much as $800K.
- After detailed analysis and discussions with users, the Records Management Group disconnected its classified transmission line (SIMEX), which had served the Laboratory since 1940. The line's main use came from one customer, who found a much less costly alternative system. The resulting savings will be a minimum of $450K per year.
- The Data Storage Systems Group achieved savings in several areas. The group increased its ADSM processing power by creating server images rather than buying new machines and licenses that would have cost about $100K per server. For the common file system, the group replaced its IBM

mainframe with CMOS/S390 technology. The replacement enabled Y2K compliance while still using the IBM Host Library Component and saved approximately $170K in license, maintenance, and hardware costs. Finally, changing elements of the group's hardware maintenance contract to a less expensive vendor will save the division about $170K annually.

Technical Communication Awards

The Communication Arts and Services Group in CIC Division helps Laboratory staff members communicate their work by offering a variety of publication-related services, such as writing and editing, composition and layout, and graphic arts. Each year, group members enter the publications they help produce in an annual competition sponsored by the Society for Technical Communication (STC). Competition categories cover technical art, technical publications, and online art and publications. The first round of the competition is held at the regional level, with the top regional winners going on to an international competition. Four levels of awards are given.

In FY98, Los Alamos won 18 regional awards and 5 international awards. One of our international winners—CIC Division's annual report (see Fig. 1.1-18)—garnered a first-place award (Distinguished Technical Communication). Three winners received second-place awards, and one received a fourth-place award. To win the top award, our annual report competed against 29 entries from the United States, Europe, and Asia. Of these entries, only four received the coveted Award of Distinguished Technical Communication.

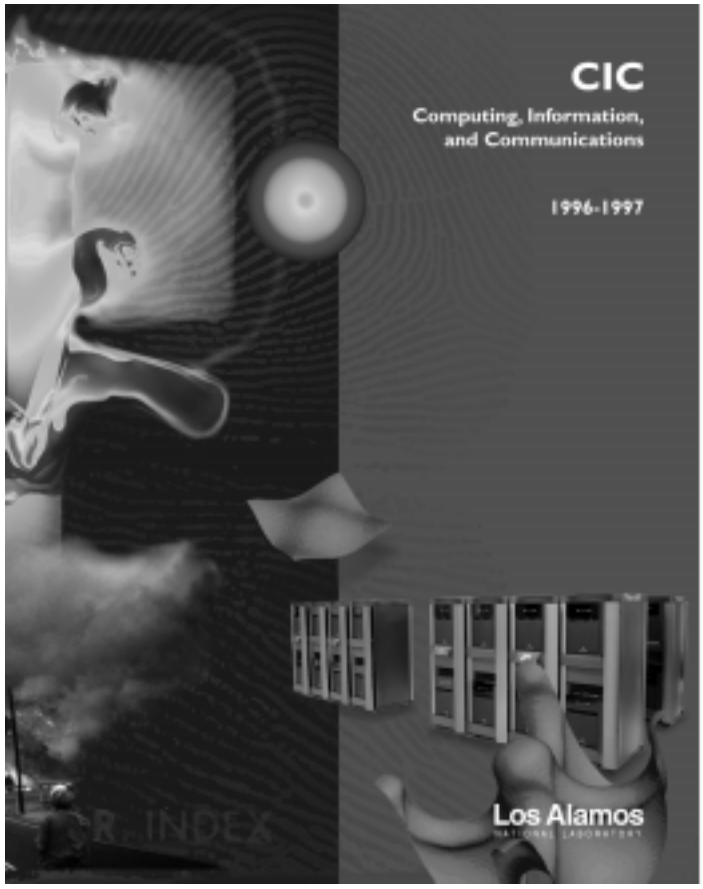


Figure 1.1-18. Front cover of CIC Division's annual report for 1996–97 (original is in color). The report won an Award of Distinguished Technical Communication in the STC's international art competition.

Performance Assessment

In this section, we have discussed an assortment of IM projects and services at the Laboratory. But these are only the “tip of the iceberg”—information management covers a very broad spectrum of activities, and it is impossible to cover all of them in this report. Fortunately, DOE’s and UC’s attendance at our quarterly performance reports over the past few years gives them considerable familiarity with our overall IM operation. They understand the issues we face and the resources that we have to deal with them. Year after year, we have continued to drive costs down—this year was no exception. At the same time, our customers report that the quality of our products and services continues to improve. This is what “operational effectiveness” is all about!

The projects that were reviewed in this section reveal that we continue to improve our IM products and services and that we’ve added some exciting new activities to our portfolio. Our desktop costs have fallen considerably over the past three years and are approaching Gartner Group standards. This is remarkable when you consider the complications associated with classified computing. Our Information Architecture and Library without Walls Projects continue to be the “best in class” within the DOE community. The leaders of both projects are frequently asked to present our work to the external IM community. Both the Xerox and the LOCATES projects exhibit innovative approaches to traditional records management activities. These projects will be the cornerstone of our records activity in the 21st century. The DOE Directives on Explorer project received Vice-President Gore’s Hammer Award, the DOE Energy Quality Award, and the DOE Gold Pin Award. Numerous DOE sites throughout the country are in the process of implementing the Explorer software. Our help desk is operating at national standards, and our financial management of IM budgets is once again “right on target.” Overall, the operational effectiveness of the IM program at Los Alamos is “outstanding.”

Criterion 1.2—Customer Focus

IM products and services meet customer requirements. (Weight = 30%)

Performance Measure 1.2—Level of Customer Satisfaction

Evaluation of customer satisfaction reviews and implementation of activities toward improvement. (Weight = 30%)

Assumptions

Measurement deliverable—results of customer satisfaction reviews.

Gradients

Good—a systematic approach to the measurement of customer satisfaction; evidence of meeting commitments to customer requirements.

Excellent—cost-effective and/or innovative approaches to measuring customer satisfaction, customer involvement throughout the life cycle of IM activities, and evidence of improvement in customer satisfaction.

Outstanding—sustained high level of customer satisfaction.

Performance Measure Results

In March 1998, President Clinton issued a memorandum describing a new phase of his administration's reinventing government initiative called "Conversations with America." This new initiative called for engaging customers to determine the kind and quality of service they want and their level of satisfaction with existing services. It also called for addressing customer complaints and solving them quickly and systematically. Furthermore, lessons learned from tracking customer service measures are to be integrated into an organization's strategic and operating plans.

The Computing, Information, and Communications (CIC) Division has taken proactive measures to exceed the requirements of President Clinton's initiative. Over the past year, we have moved from simply measuring customer satisfaction to implementing an integrated system for enhancing customer relationships. This system not only aligns with the President's initiative but also supports our efforts to use the Baldrige criteria as a framework for ensuring performance excellence.

As shown in Fig. 1.2-1, our customer relationship enhancement system has three steps:

- Define customer requirements
- Build ongoing customer relationships
- Determine customer satisfaction

The following sections explain how we are implementing this system and provide examples of the data it is giving us on customer satisfaction with CIC products and services.

Step 1. Define Customer Requirements

In a rapidly changing environment, many factors affect customer requirements, making it necessary to listen to and learn from customers on a continuous basis. Given the diversity of the services provided by CIC Division, we have implemented a variety of listening and learning strategies for keeping up with customer requirements.

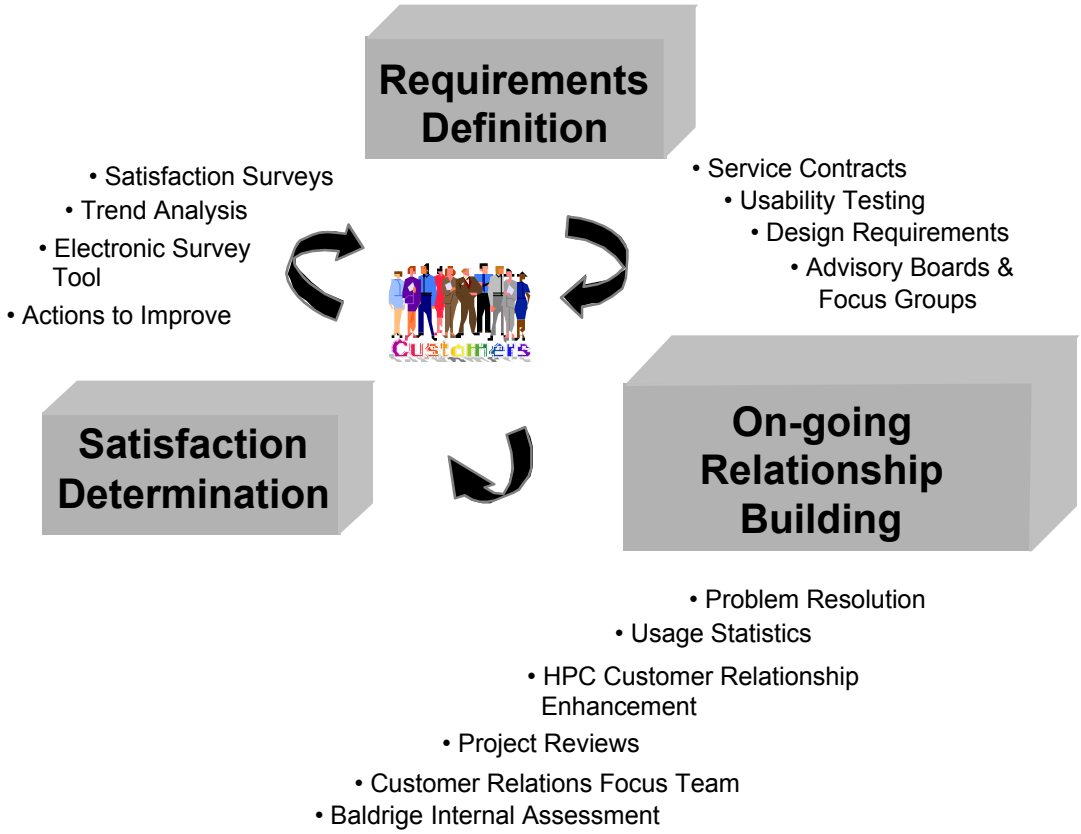


Figure 1.2-1. CIC Division's integrated system for enhancing customer relationships.

Service Contracts
When the Desktop (CIC-2) and Scientific Application Development (CIC-12) Groups assign employees to field locations, they work with customers to develop requirements in the form of service contracts. These service contracts specify the level of service that will be delivered and the levels of performance.

Usability Testing
A crucial aspect of ensuring user satisfaction with the software produced in CIC is to provide efficient, intuitive interfaces. This is equally true for enterprise systems, custom business applications, and scientific applications. A key strategy for producing successful interfaces is to include usability testing as part of an overall "user-centered" design process (see Fig. 1.2-2). Usability testing is important because it adds another perspective to the design process. Skilled and experienced interface designers are often the least objective testers, being far too familiar with their own work to be able to exercise the software as a new user would. Our user-centered design process includes testing by users before a product is released.

The principle of usability testing is to try software still in development on real users to learn how they will use it. This is different from software correctness testing because it is intended to guide the interface design, not to find programming bugs. New software and significant updates of existing software all undergo usability testing. We have fully integrated such testing in the design cycle and have shown it to be a very effective way to understand customer requirements.

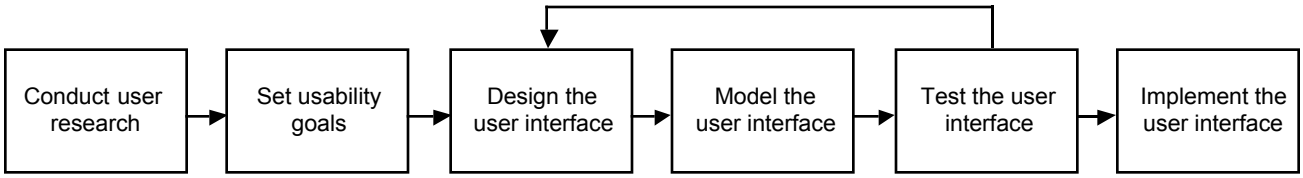


Figure 1.2-2. Our "user-centered" process for designing interfaces includes user testing before a product is released.

Design Requirements

To gather information on the telephone requirements not only for phones on Laboratory property but also for Laboratory employees who require network access from their homes, our Telecommunications Group (CIC-4) surveyed customers with an electronic data-gathering tool designed by CIC's Advanced Database and Information Technology Group (CIC-15). This survey was done to learn customer requirements and to rank them in terms of their importance. Similarly, the Network Engineering Group (CIC-5) surveys its customers in order to design networks based on customer requirements. In addition, the Information Architecture project publishes information on proposed Lab hardware and software standards to allow staff members to provide feedback on them.

Advisory Boards and Focus Groups

Advisory boards are groups of customers who volunteer to provide direction and in-depth suggestions to an organization. Typically, advisory boards consist of influential customers and technical experts. Members rotate on or off the board at least every two years. Advisory boards are also referred to as executive committees and working groups.

The Research Library (CIC-14) has an advisory board that meets monthly. The board represents CIC-14's technical customers from all of the Laboratory's core competencies and advertises openings as they arise. Potential board members are selected based on their interest in the Library and their representation of the Lab's core competencies. The Library group leader and the advisory board chairman interview potential candidates, and the board selects new members based on their recommendations. The Science and Technology Base Program Office is the Library board sponsor and signs off on membership decisions.

The External Computing project's principal customer, the Defense Special Weapons Agency (DSWA), has a user group managed by an executive committee. The committee works independently of both the DSWA and the Laboratory and takes its role as a "user advocate" very seriously. The committee meets quarterly and writes an annual performance assessment for DSWA and the Laboratory.

Last year, the Desktop Group (CIC-2) used its Desktop Advisory Working Group, consisting of 12 leaders from Lab groups that use desktop support services, to help determine how to charge divisions for Lab-wide software licenses. In addition, in January 1998 the working group finalized a white paper that proposed a new geographically based computer support model for the Laboratory.

Focus groups, like advisory boards, are composed of customers who are willing to give their opinions on products or services. However, unlike advisory boards, which typically meet regularly, focus groups meet once or twice to discuss designing or upgrading a particular product or service. The Research Library uses focus groups to solicit customer input on proposed products and services. Customer comments are then channeled to the teams charged with developing the product or service. The Telecommunications Group recently used a focus group to determine if its customers wanted "one-stop shopping" for its services and how they wanted to do such shopping. Input from focus group discussions guided the team's decision process.

Step 2. Build Ongoing Customer Relationships

This step of our relationship enhancement system is critical to customer satisfaction because it provides us with a way to understand and manage customer expectations. Our goal in this step is to provide easy access for customers seeking information or assistance with a problem and to quickly resolve the problem. Because customers have different requirements, we have chosen several methods to provide customer service, enhance customer relations, and resolve problems.

Problem Resolution and Usage Statistics
A large, diverse set of customers uses our administrative and scientific computing resources. To help them, we have integrated several support systems. The model shown in Fig. 1.2-3 indicates that consultants are our front line for solving many customer problems. If a consultant cannot assist a customer, data on the problem are fed into Remedy, a centralized system that automatically sends notices to the network, storage, and mainframe support employees who resolve technical problems. At the same time, our Integrated Computing Network (ICN) News is updated with the data so that customers can check on the status of their problem. ICN News gets data automatically from all the nodes in the network and displays the network status. Our consultants also work closely with training staff to ensure that problems that can be corrected with additional instruction are addressed in training.

For Accelerated Strategic Computing Initiative (ASCI) users, problems and questions are recorded in ClearDDTS, a vendor-supplied trouble-tracking system. This system links to the vendor (SGI/Cray) so that customers can direct problems to SGI/Cray system engineers. Additionally, a telephony system monitors all customer interactions with CIC consultants so that a monthly analysis can determine trends and pinpoint recurring problem areas. This information is passed on to system developers for resolution.

The Research Library serves another large set of customers. Recently, the Library expanded its customer feedback system to capture customer comments and channel them to a central system for processing. Customer comments and satisfaction levels are recorded, tracked, and analyzed, and complaints along with their resolutions are tracked for trend analysis.

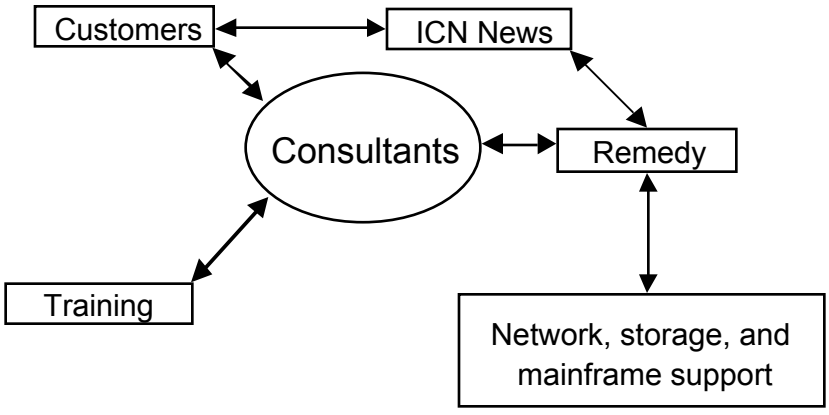


Figure 1.2-3. Model for how CIC Division responds to customer problems and collects data on those problems.

High-Performance Computing (HPC) Customer Relationship Enhancement
One of CIC's largest customers is X-Division. For the past two years, CIC's HPC Focus Team has surveyed X-Division customers on their satisfaction with CIC products and services. (A third survey is planned for September 1998.) Based on results from the surveys, CIC groups supporting HPC work have focused on improving their relationships with X-Division. One of the major efforts initiated by this focus team was the X-Division Computing Coordinating Committee (XDC-Cubed). The purpose of this committee is to ensure that we consider customer input on our direction and operations and to provide

X-Division customers with an effective way to get information or assistance from us on a regular basis. The committee's efforts have been very successful: in its 1998 report, the External Review Committee for CIC Division cited our improved relationships with X-Division as a noteworthy accomplishment. (An excerpt from the report is attached at the end of this report section.)

CIC's other major HPC customers are users of the ASCI supercomputers. Because of the research nature of the ASCI program, the computing environment is more experimental than stable. Unless this environment is closely managed, users could be adversely affected. The group leader of the Computing Group (CIC-7) meets weekly with ASCI users to share information about enhancements and changes to the environment. He also gathers information from users on problems they have experienced so that their problems can be resolved quickly.

Project Reviews
Our research groups (CIC-3 and CIC-19), along with the ASCI project, have established direct, ongoing contact with their customers through project reviews. These reviews are used to obtain information from customers and to keep them informed about the project's status. The reviews also give customers the opportunity to impact the direction of the project. Formal project reviews, periodic progress reports, project advisory panels, and one-on-one meetings with customers are all used.

Customer Relations Focus Team (CRFT) and the Baldrige Internal Assessments
Two processes that support customer relationships at the division level are the Baldrige internal assessments and the Customer Relations Focus Team (CRFT). For the past two years, CIC has conducted internal assessments based on the Baldrige criteria. Participants are trained in the criteria as well as in examination and assessment skills and assigned to one of the seven Baldrige categories. Thirty-six customers and employees plus the CIC leadership team participated in the assessments; their results were used as input to CIC Division's strategic plans and as a measure of customer satisfaction (see assessment results under Criterion 1.3). Customers who have participated in these assessments have indicated that they are an exceptional way to provide input into CIC's direction.

The CRFT, originally chartered because of feedback from our first Baldrige assessment, serves as the focal point for researching and developing consistent methods to promote effective customer relationships. This past year the team developed a matrix of customer interaction processes and wrote white papers to assist group leaders in improving their customer relationships. The team also sponsored a seminar by Dr. Sheila Kessler, the author of three books on measuring and managing customer satisfaction. Dr. Kessler also held individual tutorials with group leaders on specific customer satisfaction issues related to their groups. Based on Dr. Kessler's presentation and meetings, the CRFT will make recommendations to the CIC leadership team regarding the next steps in how we determine customer satisfaction.

Step 3. Determine Customer Satisfaction

This step in our relationship enhancement system not only looks at ways to measure and analyze customer satisfaction but also addresses actions we can take to ensure quick resolution of problems. One of the innovative and cost-effective developments this year was the electronic survey tool developed by CIC-15. This tool is now being used not only by CIC Division but also by other divisions at Los Alamos, by DOE, and by the University of California. The tool allows organizations to tailor their surveys specifically to their needs. Another noteworthy achievement this year was the fact that we began to chart trends in customer satisfaction with many of our products and services. Such analyses help us ensure that the efforts we take as a result of our surveys have the desired effect.

A number of charts that show trends in customer survey data from FY97 and FY98 are included on the following pages. Data in most of the charts represent customer satisfaction on a scale of 1 to 5. Questions from the surveys are worded to elicit a response that indicates how strongly the customer agrees with a statement about the quality of CIC's products and services. For example, a statement might be, "Information and issues between X and CIC Division are communicated effectively." The

percentage shown represents customers who responded with a 4 or 5 (“agree” or “strongly agree”). The exception to this scoring system is the Research Library data; the Library uses an inverse scale of 1 to 3 (delighted, satisfied, or unsatisfied) in its surveys.

As mentioned earlier, the HPC Focus Team has surveyed its X-Division customers for two years. Survey data show that the team’s efforts are improving customer relationships (Figure 1.2-4).

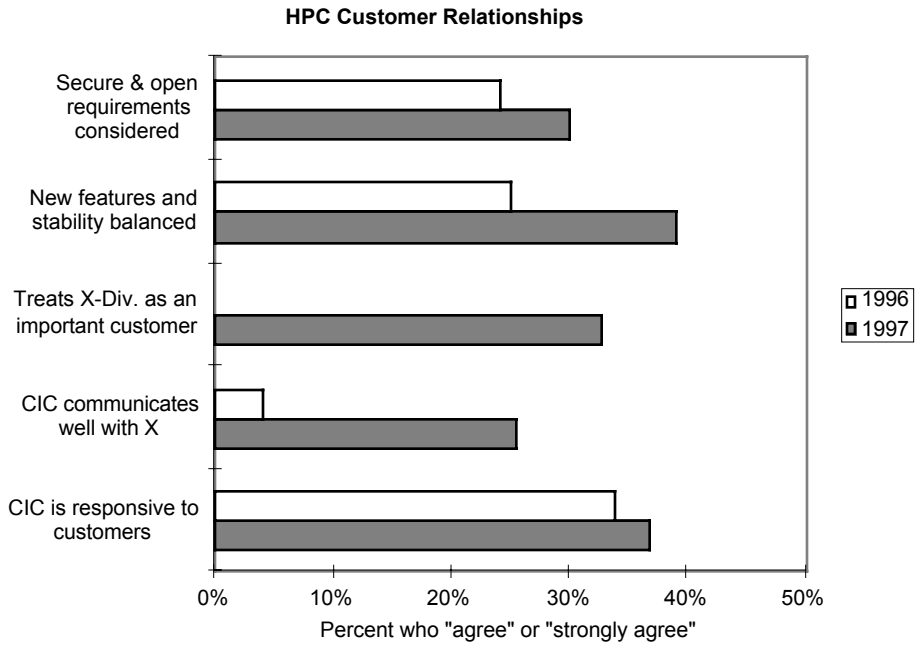


Figure 1.2-4. Survey data show that CIC relationships with X-Division customers have improved.

In a 1996 survey, customers challenged the Communication Arts and Services Group (CIC-1) to lower the cost of its services and extend its capability to work on software and hardware that are compatible with theirs. Through process and productivity improvements, CIC-1 has lowered its service charges by almost 8% over the last two years. Although CIC-1 is primarily a Macintosh shop, the group also began buying PCs and training staff to use them. Data from the 1997 and 1998 customer surveys show overall improvements on both of these issues. Figure 1.2-5 shows improvements in customer satisfaction with CIC-1 services. Figure 1.2-6 shows increasing customer satisfaction with the skills of CIC-1 staff members.

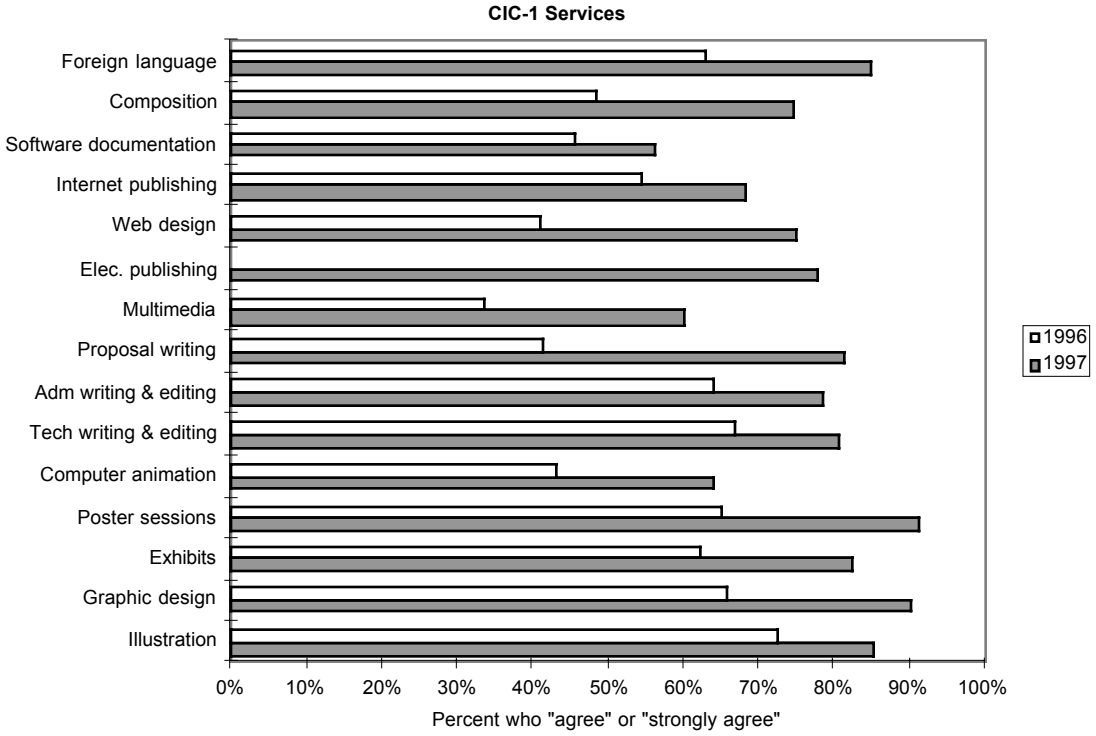


Figure 1.2-5. Improvements in customer satisfaction with the services offered by CIC-1, the Communication Arts and Services Group.

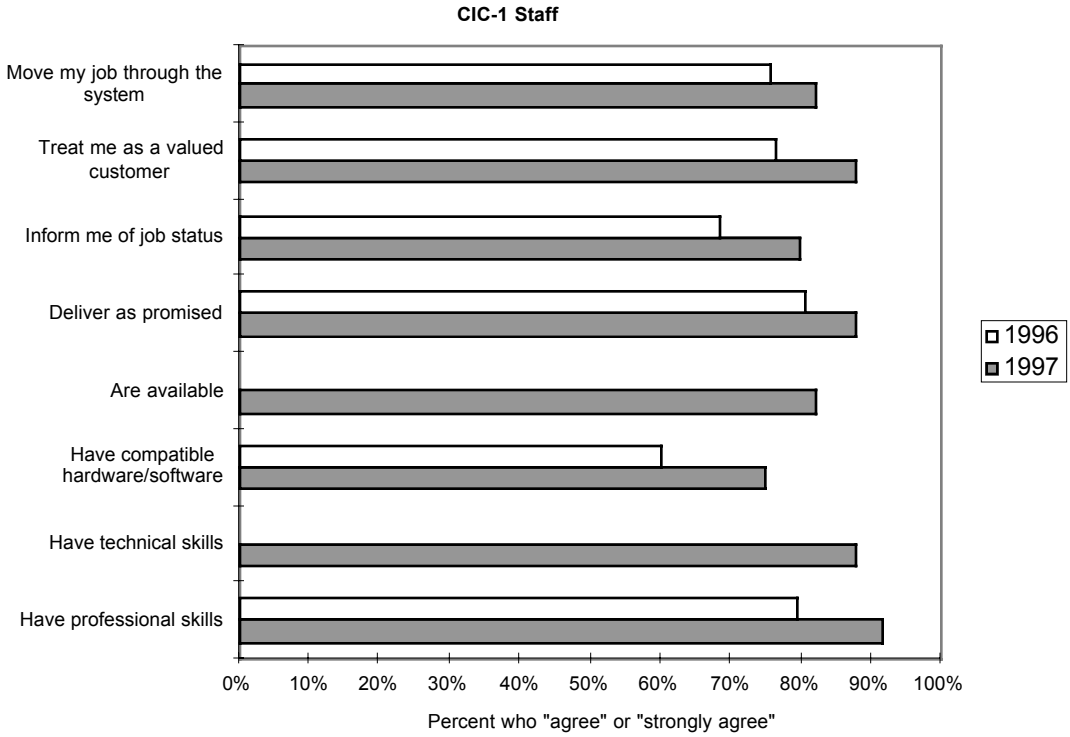


Figure 1.2-6. Improvements in customer satisfaction with the responsiveness and skills of CIC-1 staff members.

The Research Library surveys one-fourth of its customers every quarter. Data for 1996–1998 (see Figure 1.2-7) demonstrate consistently high levels of customer satisfaction.

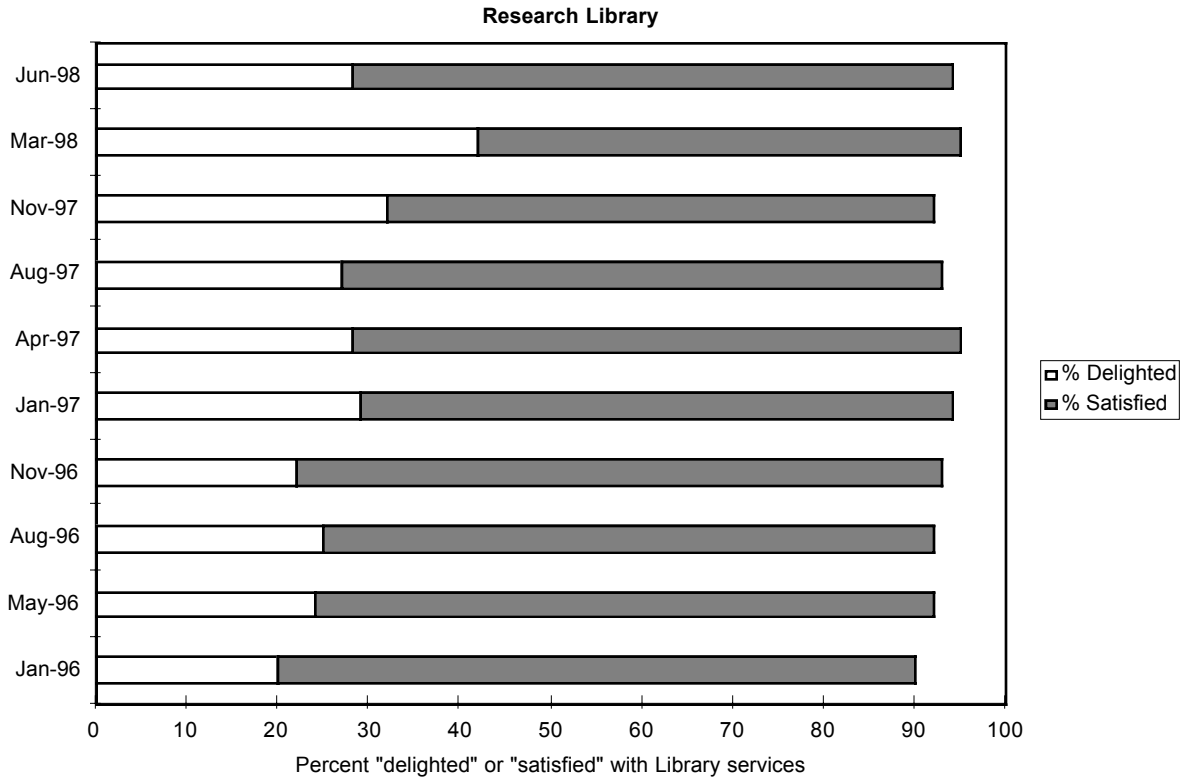


Figure 1.2-7. Customers have been highly satisfied with Research Library services since 1996.

Data from the Desktop Group (CIC-2), shown in Figs. 1.2-8 and 1.2-9, indicate improvements in the group's services and service attributes from FY97 to FY98. To achieve this success, CIC-2 focused on FY97 survey feedback and made substantive changes to its business processes. The most visible change was the addition of five dedicated team leaders to manage key aspects of the business. The group also focused on stabilizing its business by putting a priority on reducing attrition and hiring exceptional staff. This focus helped improve the group's timeliness in responding to both contract and noncontract customer requests. The main service area that did not show an improvement was user groups, an area that was not emphasized this past year. However, given the data from the FY98 survey, CIC-2's goal this coming year is to strike a balance between the frequency and content of user group meetings in order to provide customers with information when they need it.

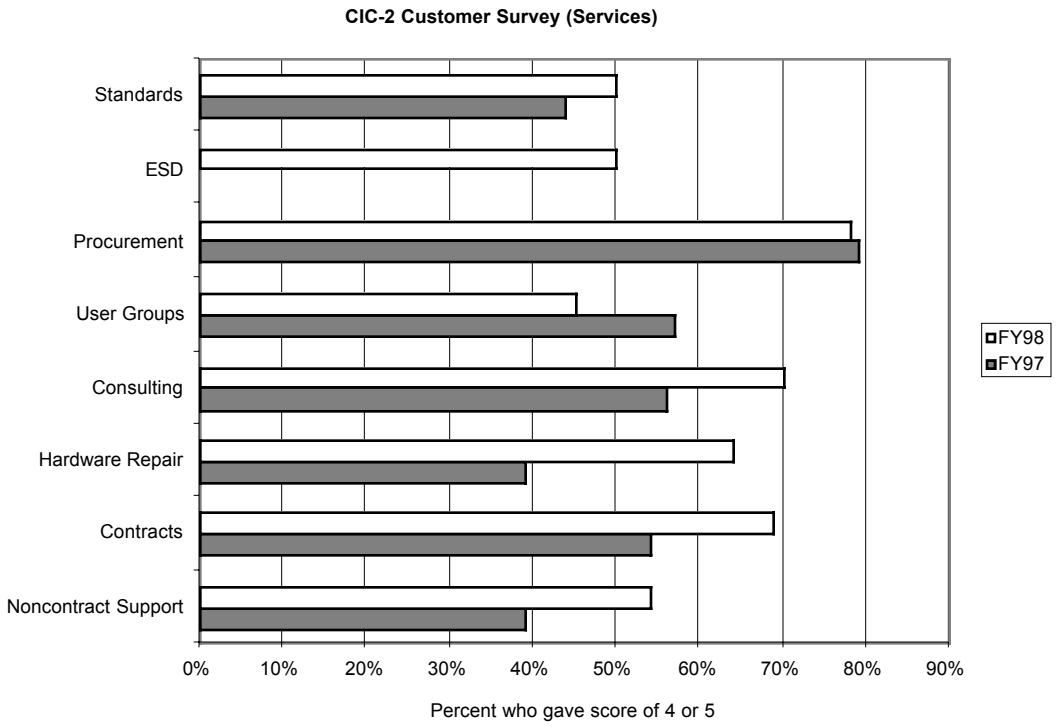


Figure 1.2-8. Comparison of customer satisfaction with CIC-2's desktop services in FY97 and FY98.

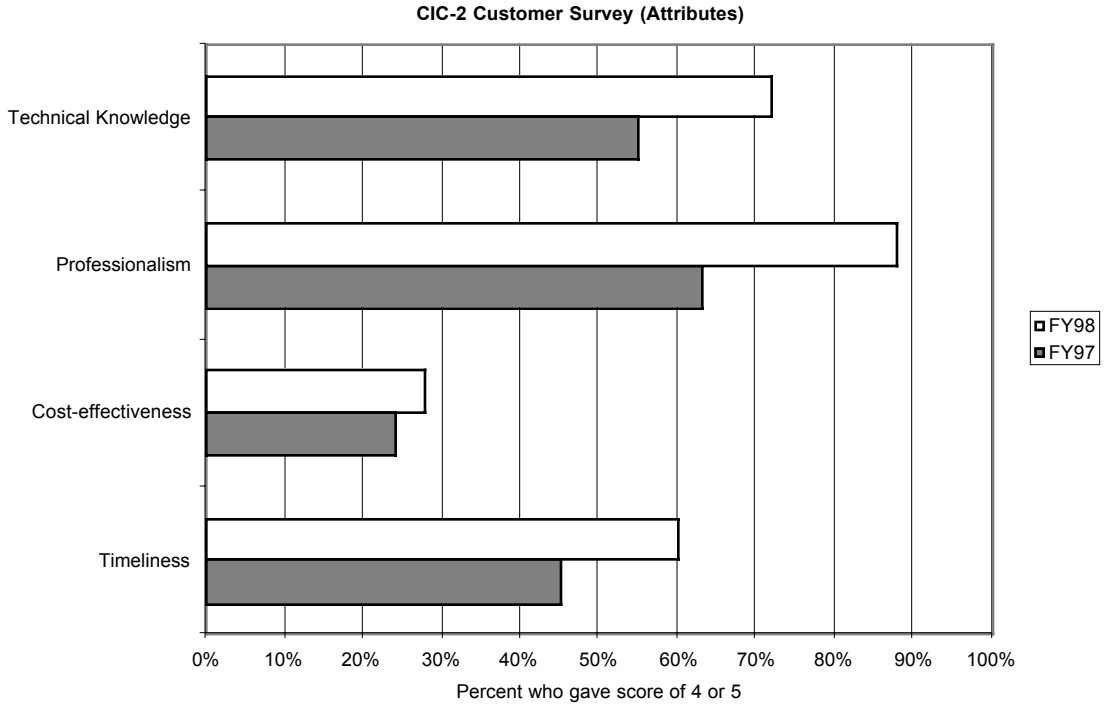


Figure 1.2-9. Comparison of customer satisfaction with attributes of CIC-2's staff members in FY97 and FY98.

The Information Architecture (IA) Project conducted its second comprehensive customer survey this past year (416 responses were received from a random sample of 1600 customers). Survey data indicate that customers continue to adopt IA software standards (see Figs. 1.2-10 and 1.2-11), that their satisfaction with IA Project efforts is growing (Fig. 1.2-12), and that they believe that standards are being adopted by the project in a timely manner (Fig. 1.2-13).

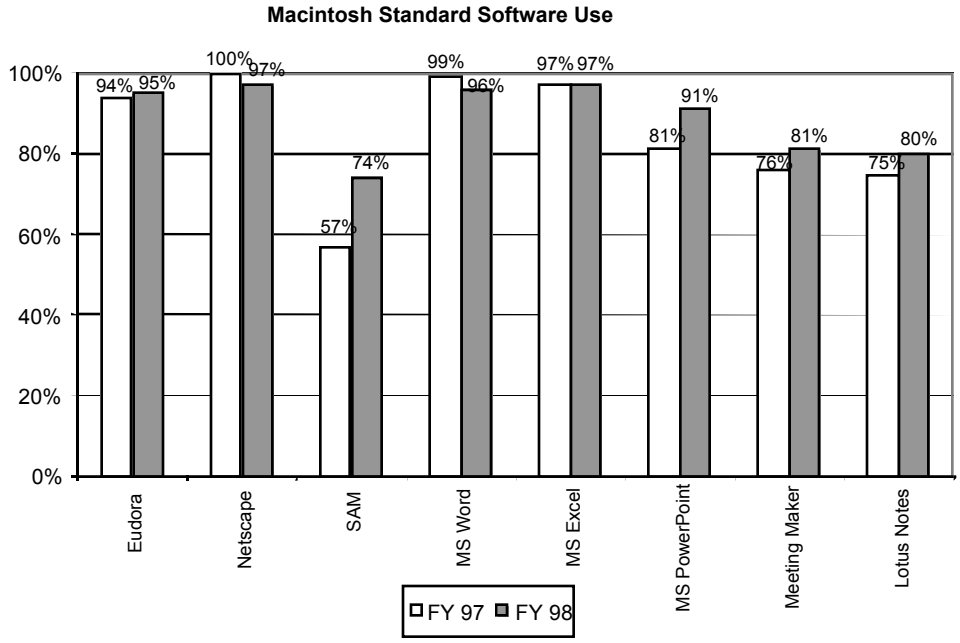


Figure 1.2-10. Laboratory adherence to IA standards for Macintosh software.

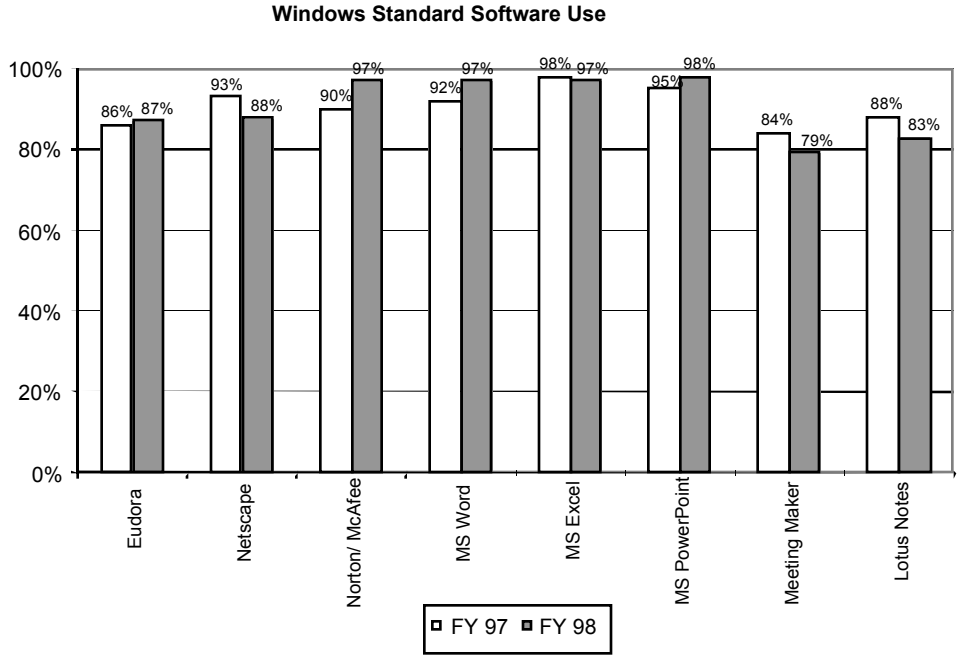


Figure 1.2-11. Laboratory adherence to IA standards for PC software.

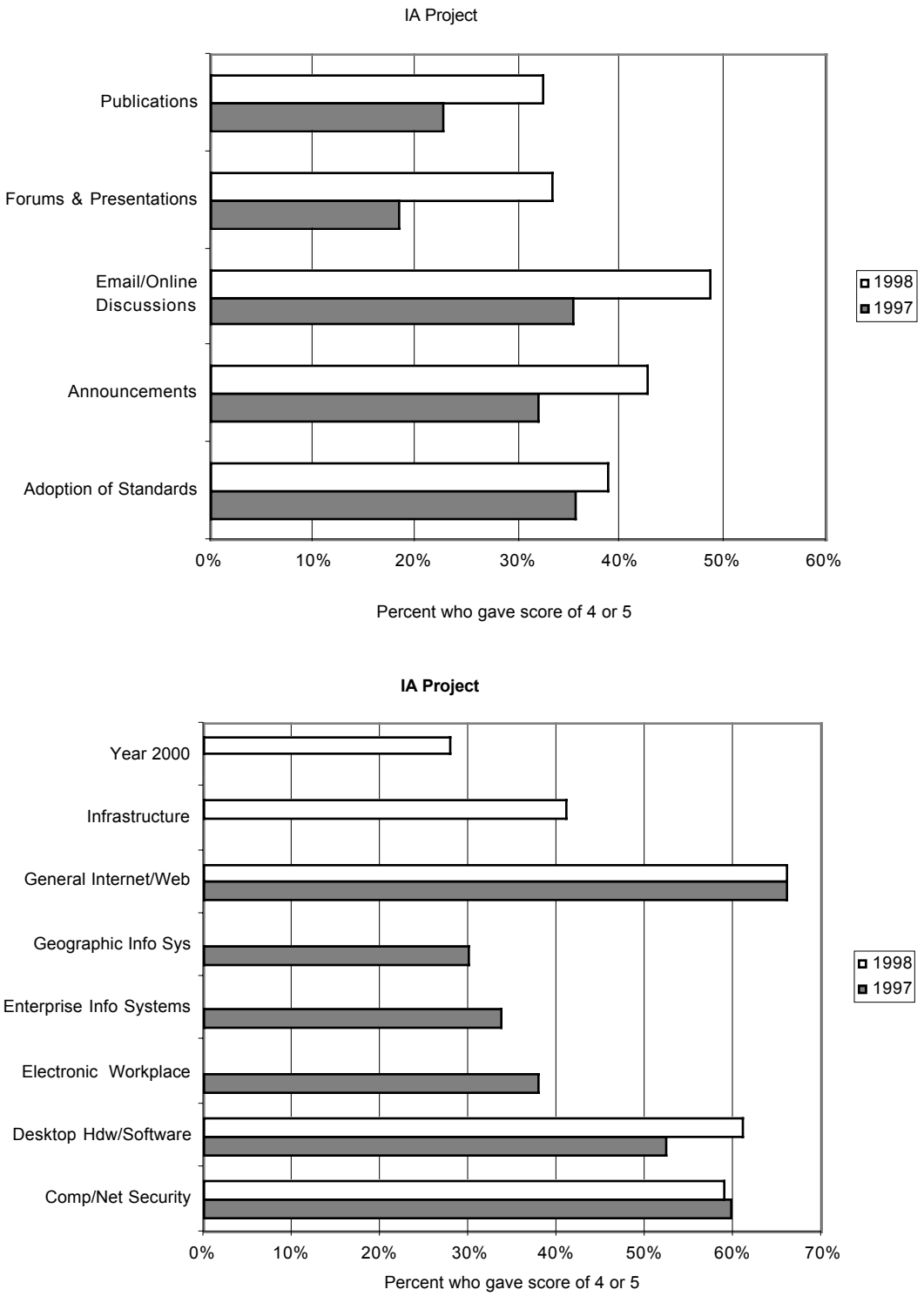


Figure 1.2-12. Customer satisfaction with IA project activities (top) and subject areas (bottom).

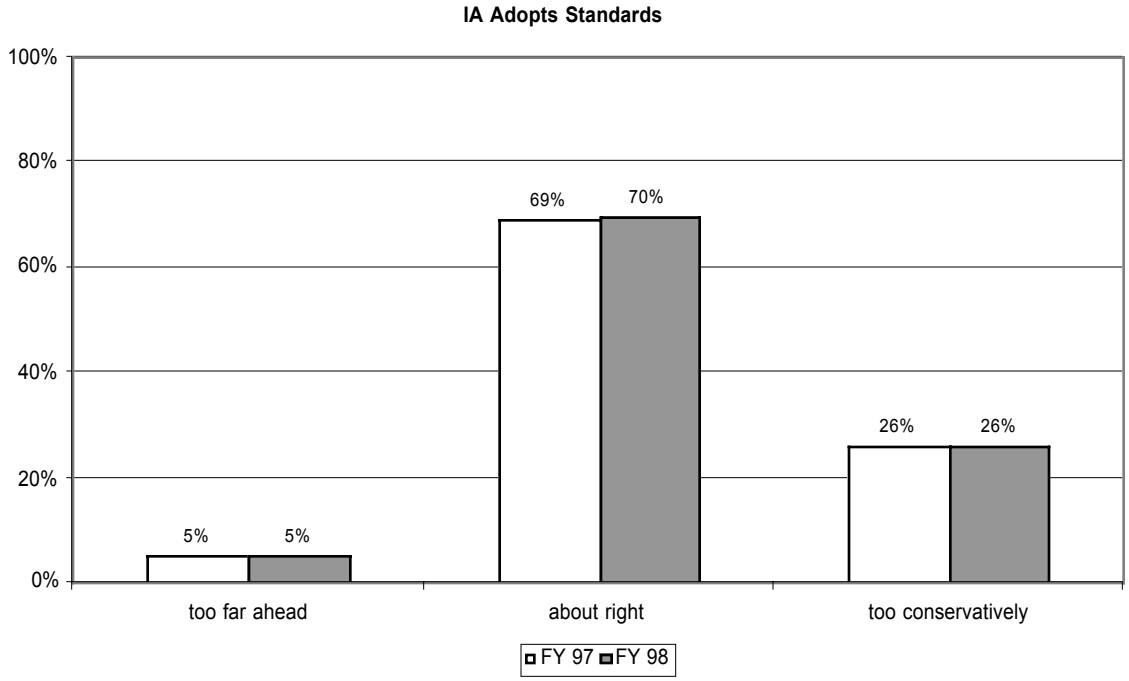


Figure 1.2-13. Customer views on the timeliness of IA Project efforts to adopt Lab-wide standards.

Performance Assessment

Over the past year, CIC Division has moved from simply measuring customer satisfaction to implementing an integrated system for enhancing customer satisfaction. This system not only aligns with President Clinton's initiative for reinventing government but also supports the efforts we have made in using the Baldrige criteria as a framework for ensuring performance excellence in the division. We have taken aggressive steps to include customer input in the design of our products and services, we have developed an integrated system of ongoing customer support, and we regularly survey our customers to ensure their continued satisfaction. Data from surveys taken over the past two years verify that our actions have had positive results. Others have also recognized our success in becoming more customer focused, as shown in the 1998 report of the division's External Review Committee (see following attachment). The implementation of our customer relationship enhancement system has improved those relationships and helped our division reach the level of providing "outstanding" customer service.

Los Alamos CIC Division External Review Committee Report for the April 1998 Review

Committee Members:

Stuart I. Feldman, IBM Corporation
Mario J. Gonzalez, The University of Texas at Austin
Michael A. Harrison, UC Berkeley (Committee Chair)
Paul C. Messina, Caltech
Cherri Pancake, Oregon State University
Gian-Carlo Rota, MIT
Paul Woodward, University of Minnesota
Katherine Yelick, UC Berkeley

Computing Services

At the time of the last DRC meeting in October, 1996, the committee identified several areas of concern: the lack of a comprehensive problem tracking process, inadequate communication of problems with locally developed software, and planning for the transition to ASCI while still providing normal production support.

During the April 1998 meeting, the Committee was provided with significant evidence indicating that there has been a remarkable turnaround in responding to these concerns. For example, a commercial Web-based product has been purchased to enable CIC personnel to work with ASCI code teams to provide continuing feedback on software bugs, issues that impact both CIC and X divisions, and management decisions. This tool is used to track problems, obtain real-time information on end-to-end system status, provide on-line metrics for all services, and notify the user community of production computing changes.

A usage system that went into production at the start of the current fiscal year provides detailed statistics on group and project computer usage, including individual and code summaries. Additionally, in order to promote communication issues, the CIC High Performance Focus Team and the X-Division Computer Coordinating Committee serve an important role as cross-divisional policy-making and planning bodies.

User satisfaction surveys, developed cooperatively by personnel from both CIC and X divisions, have been conducted during the last two years. Most of the issues examined in these surveys indicate improvements in user satisfaction that is a reflection of the significant effort made by CIC.

Interactions between X and CIC Divisions

Quality of science and engineering	N/A
Relevance to national needs and agency missions	Outstanding
Performance in the technical development and operation of major research facilities	Outstanding+++
Programmatic performance and planning	Outstanding+++

Given its role in the ASCI program and as a user community for more general production computing, X-Division is CIC's primary, though certainly not its only, customer base. Relationships between the two divisions have improved extraordinarily since our last review. This turnaround is a singular achievement. The upper level managers of the two divisions have established a strong collaborative relationship that is already yielding significant benefits to both groups.

The collaboration involves frequent face-to-face interactions at all levels of staffing. Bill Reed, Deputy Director of X-Division for Computational Physics, described the four ASCI code development projects for the committee. He explained the role of Pat Soran's code integration group (XCI) in mediating between the designers and the staff who are developing modules encapsulating new methods for the codes. This partial insulation of the designers of the numerical methods from the designers of the weapons seems an excellent idea. In his description of the four code groups, Bill Reed made clear the involvement of CIC personnel in this very important enterprise. The level of CIC participation was especially evident, and commendable, in the Blanca code project. Bill Reed stressed the good working partnership between X and CIC Divisions. This partnership is kept active through biweekly meetings of Charlie Slocomb with Bill Reed and Don McCoy, biweekly XDCCC meetings to set policies, and by the weekly ASCI users' forums. These meetings, plus a strong and very obvious commitment on the part of both management to work as a team, appear to have succeeded admirably in eliminating X's former concerns about the planned evolution of computing infrastructure.

In addition, the ASCI Users Forum has been used as a vehicle for frequent, structured interactions between X and CIC technical staff. The inter-division mix is about 50/50 at these meetings, which have become the venue for a very open interchange of opinions. Even more important, although X's participation was initially restricted to the staff actually engaged in code development, there is now significant attendance by weapons designers (who are ASCI's end-users; they use the codes developed by the X's coding teams, executed in the environments provided by CIC). The importance of these changes is that CIC now becomes aware of - and can address - user issues before they escalate into problems.

On a daily basis, CIC technical staff participate in ASCI and other code development projects within X-Division (see section on “Computer Science Support for Application Development Teams”). In addition, CIC User Support has opened an office in X-Division to make it more convenient for these users to obtain help in dealing with the production computing facilities. A Web-based problem reporting and tracking system has been put into place; it also provides real-time information on end-to-end system status and notifies the user community of production changes and schedules. Finally, CIC now runs X-Division's networks and user satisfaction surveys indicate that they are pleased with the service. This is a dramatic change from the situation at our last visit, and is attributable to CIC's proactive efforts to "win over" a key customer base.

On Thursday morning, Q-cleared committee members were invited to see demos of results of the ASCI code projects. These demonstrations, despite glitches, were very interesting. Results from the Blanca and Crestone code projects were presented. The greater CIC involvement in the Blanca project is perhaps a reason why that code seemed to be significantly further along in the process of adaptation to the parallel environment of the new ASCI computing platform. The Crestone project focus seemed to be more on getting the code running and producing the novel computations that this code makes possible. Those computations have been presented at the ASCI PI meetings to very good effect. However, with the cooperation of this code group, CIC should be able to accelerate the transition for Crestone to the new ASCI machine architectures. Full exploitation of these machines would enable significant increases in the size of runs this group could perform. The CIC support strategy, with its focus on building parallel code frameworks, libraries, and run-time system features, should make it easier to extend successes from the Blanca project to the other ASCI code efforts. The transition from POOMA-I to POOMA-II should reposition this support framework from a flat MPP architecture perspective, where all processors are equally well connected to each other, toward the SMP cluster architecture of the ASCI machine. The new thread-based approach to exploiting the shared memory of each SMP in the cluster is incorporated in the software underlying the POOMA-II framework. This should make better use

of the ASCI hardware for codes that do not possess the regular structure that comes from the grids used in the Blanca project. For codes like Crestone, some restructuring of the computation at a relatively high level may be necessary to exploit the thread-based POOMA-II technology. For this reason, a partnership of the system library builders and the code builders is recommended. It may not be either possible or advisable to completely hide the SMP cluster architecture from the high-level code.

One overall impression was clear from the demonstrations in X-Division, namely that the ASCI computing platforms and code development efforts have given the designers the capability to simulate at a level of detail never before possible. The excitement generated by this new capability was palpable.

CIC and X divisions appear to be working together in a cooperative and productive manner. We commend this achievement, and encourage CIC not only to continue expanding its teamwork with X-Division, but to extend it to other portions of the Laboratory as well. This is a significant achievement and all involved deserve significant recognition possible even bonuses or awards.

Criterion 1.3—Effective Internal Controls and Compliance

Provide for effective internal controls and ensure timely and effective resolution of identified weaknesses. (Weight = 20%)

Performance Measure 1.3—Internal Controls and Compliance Process Management

Degree to which an effective system for identifying, reviewing, and correcting (if identified) information management (IM) internal control and compliance processes is maintained. (Weight = 20%)

Assumptions

Measurement deliverable—describe and self-assess the techniques employed to ensure effective process controls, specifically addressing focus areas and any information management compliance issues appropriate to the Laboratory. The Laboratory and its DOE Operations Office will agree on focus areas.

"Compliance" refers to requirements of law, regulations and applicable DOE directives. To avoid duplication, the Laboratory will either self-assess or rely on recent internal or external audits, reviews, or assessments of relevant activities.

Gradients

Good—management techniques are employed to assess internal process controls, which include compliance and/or focus areas, and to correct identified deficiencies. Objective supporting material is available evidencing progress in identifying and correcting issues. Previous deficiencies have been corrected or have corrective action plans in place.

Excellent—there is a sound systematic approach responsive to the overall purpose of managing assessment processes and implementing corrective actions. Substantive progress has been made in self-identifying and closing deficiencies.

Outstanding—the Laboratory has institutionalized an evaluation process control for compliance issues and corrects weaknesses. This results in all compliance and agreement areas being corrected.

Performance Measure Results

Self-assessment is an integral part of the Integrated Management Process (IMP) used by CIC Division to manage its activities (Criterion 1.4 defines our IMP). In addition to assessing our performance with the Appendix F process and through feedback from our customers, we also measure division activities against the Baldrige Quality Award criteria. The results from these varied assessments feed into our strategic and business planning processes, which provide the mechanism for identifying what needs to be done in order to meet the Laboratory's strategic and tactical goals.

Self-assessment is an ongoing activity in the division, and CIC managers are responsible for assessing their own operations and for reporting quarterly on progress made toward milestones and on problems or issues that have arisen. Through such quarterly reports, the division ensures that self-assessment is ongoing and that corrective actions are taken when necessary. This process allows us to be proactive rather than reactive—by identifying problems early on, we have a better opportunity to respond to issues that might negatively impact projects and milestones. DOE, UC, and Laboratory audit staff are invited to attend our quarterly business planning meetings and often take advantage of this invitation.

We are happy to report that in FY98 there are no noncompliance issues in the IM area. Earlier in the year, we agreed to report on the following three activities in this section of our Appendix F report:

- Year 2000 (Y2K) readiness
- Records inventory
- Printing and publishing

In addition, we also describe the following assessment efforts and achievements:

- Baldrige internal assessment process
- Research Library's Quality New Mexico Award
- Mark Graham Brown collaboration
- Information sharing

Year 2000 (Y2K) Readiness

CIC Division's Information Architecture (IA) Project is spearheading the Laboratory's efforts to prepare for the Year 2000. FY97/98 activities related to these preparations are listed on the calendar shown in Figure 1.3-1. The following text highlights a few major Y2K activities, which appear on the calendar as boldface entries.

July 1997—Four Laboratory DOE mission-essential systems identified and submitted to DOE as a first step in ensuring our Year 2000 readiness.

DOE required that all sites identify their DOE mission-essential systems for Year 2000. Los Alamos identified four: classified records (CARLA), the secure Integrated Computing Network (ICN), nuclear material accountability (MASS), and the secure alarm system (BRASS). All mission-essential systems must be Y2K-ready by March 31, 1999.

CARLA—The classified records system, CARLA (computer-assisted retrieval at Los Alamos), is being replaced with new technology based on a commercial document management system, Documentum. The new system (called CLOCS) is based on the unclassified document management system (LOCATES) that is now in operation.

Secure ICN—The secure ICN is the Laboratory's classified computing environment, which focuses primarily on satisfying the needs of the Weapons Program. It includes the hardware and software for our supercomputers, networks, file systems, and output systems. A CIC Y2K team, chartered by CIC's High-Performance Computing Focus Team, is working to ensure that both the secure and open networks are ready for the century change.

MASS—The Nuclear Material and Accountability System (MASS) was mostly compliant. The application developers implemented 4-digit years more than 5 years ago in anticipation of the century change. The measurement control program required modification, which has been done; the system is now operational.

BRASS—This alarm system controls the alarms and badge readers in secure areas at Los Alamos. BRASS is well on its way to Y2K readiness. We originally estimated that this system would be implemented in February 1999. Given the request from DOE headquarters to speed up progress, however, we were able to reallocate resources and modify plans so that we now expect system implementation in December 1998.

October 1997—IA Year 2000 Web site launched for Laboratory (http://www.lanl.gov/projects/ia/year 2000/).

The World Wide Web has provided a wealth of information about Year 2000. The IA Year 2000 Web site provides selective links to vendor sites regarding the Y2K problem and status. For example, it links to the Y2K status of all IA standard software and hardware products, to information on the readiness of Laboratory embedded-system products, and to very useful articles about Y2K testing. The IA's Y2K Web site includes the following features:

- Tip of the Week—Highlights of current technical issues are given, with links to more information on them. One can become quite educated on Y2K issues by reviewing the Tip of the Week archive.
- FAQ—The Year 2000 problem is discussed in a Q&A format.
- Readiness—The Y2K readiness of IA standard software and hardware is summarized, with direct links to the manufacturers' Year 2000 Web pages.
- Selected sites—Links are given to information on the Year 2000 status of other widely used products, including selected links to current government information and technical publications.
- Year 2000 Council—The Laboratory's Year 2000 Council roster, working documents, and reports are available at this site; access to the Council's Year 2000 database is also available.

November 24, 1997—All-Managers Year 2000 briefing.

Diane Weir, the Information Architecture Project Leader and chair of the Year 2000 Council, spoke to Lab managers about the realities of Year 2000 at the Laboratory. This talk led to invitations from many managers for Diane to speak to their groups, which she accepted. In all, Diane has presented Y2K awareness briefings to more than 1,500 employees at the Laboratory.

February 20, 1998—Master management memo from Laboratory Director, John Browne, supports Year 2000 Council activities.

John Browne announced the formation of the Year 2000 Council, listed the council representatives, and asked managers to support the council and the Year 2000 assessment. Browne noted that the "Laboratory-wide assessment is needed to satisfy both good business practices and to respond to DOE concerns regarding our Year 2000 readiness."

April 20, 1998—First Laboratory-wide Year 2000 assessment report.

On April 20, the Year 2000 Council issued its first assessment of the Laboratory's Y2K readiness. The assessment primarily focused on computer systems and estimated that it would cost $6 million to fix the identified problems. However, the report also stressed the need to assess Laboratory embedded systems—systems that use a computer or a chip but are not commonly considered as computers.

This assessment report was just the beginning of a process that will take the next 17 months to complete. Now that we are beginning to understand which computer systems need to be modified, retired, or replaced, we are proceeding to plan, perform, and test the needed repairs. The Year 2000 database continues to track schedules and cost estimates as we make progress.

Year 2000

4Q 97

July
Four Laboratory DOE mission-essential systems identified and submitted to DOE as a first step in ensuring our Year 2000 readiness.

September
Information Architecture (IA) project leader, Diane Weir, assigned the task of coordinating Year 2000 activities for the Laboratory.

1Q 98

October
IA Year 2000 Web site for Laboratory launched (http://www.lanl.gov/projects/ia/year2000/).

October 2
First CIC Year 2000 forum.

October 29
Attended DOE/AL meeting on Year 2000; this was a call to action for the Laboratory from DOE.

November 24
All-Managers Year 2000 briefing by IA's Diane Weir.

December
BITS article: "Is Your Computer Ready for the Year 2000?"

Reflections article: "PC...Phone Home"

Figure. 1.3-1. FY97/98 activities aimed at preparing the Laboratory for the Year 2000. Boldface calendar entries are described in the accompanying text.

2Q 98

January 15
CIC HPC focus team chartered a Y2K team to ensure Year 2000 readiness of the secure and open Integrated Computing Network (ICN).

February
Briefed the X-Division Computing Coordination Committee about Year 2000.

February 4
First Year 2000 Council meeting, with newly appointed Year 2000 representatives from most Laboratory groups and divisions attending.

February 20
Master management memo from Laboratory Director, John Browne, supports Year 2000 Council activities.

February 27
Preliminary Assessment Report sent to DOE/AL. CIC-15 designed Year 2000 database to collect assessment data.

March issue
BITS article: "System Layers and the Year 2000 (cake)."

March 11-12
Attended EFCOG meeting at Pantex to share Year 2000 experiences with other DOE sites.

March 16
DOE/HQ site visit to review DOE mission-essential and Laboratory-wide Year 2000 activities and progress.

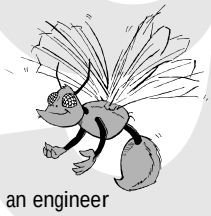
3Q 98

April 7
First Year 2000 security briefing given. Attendees received security refresher credit and computer security refresher credit. Six hundred and forty attended six Lab-wide briefings.

April 15
Met with division leaders who report to Tom Garcia, Acting Deputy Laboratory Director for Business Administration and Outreach, about Year 2000.

April 20
First Laboratory-wide Year 2000 assessment report.

May
Year 2000 awareness campaign poster series launched.



May 14
Met with David Ota, an engineer with the NM Year 2000 group, about embedded systems.

May 28
Met with Laboratory facility managers, who requested an institutional approach to Year 2000 embedded-system issues.

June 5
Met with Jim Jackson, Acting Deputy Laboratory Director for Laboratory Operations, to brief him about Year 2000 embedded-system issues.

June 8
Laboratory Director's Executive team approved $300,000 for a Year 2000 facilities survey.

June 15
Milestone met for DOE mission-essential systems test plan.

June 17-24
Audit of the audit: DOE Office of Oversight audited the original DOE Year 2000 audit. The Laboratory received new requirements from DOE for non-mission-essential systems.

4Q 98

July 2
IA-8302: Laboratory Standard Date and Time Notation (IA recommendation to conform to ISO-8601 to ensure Year 2000 compliance).

August 4
Laboratory DOE mission-essential systems test plans sent to DOE/HQ.

August 4
Responses submitted to questions on Year 2000 requested by University of California audit firm of Deloitte and Touche.

August
IA-8601: Standard "Y2K" Software for Year 2000 Test of PC Hardware (PC BIOS/RTC testing tool product available free of charge on ESD).

August
Year 2000 Laboratory facilities survey begun.

A lot has been done, but there's more to come...

ia

For more information on the Year 2000, contact Diane Weir (drw@lanl.gov) and visit the IA Year 2000 Web site: http://www.lanl.gov/projects/ia/year2000/.

June 8, 1998—Laboratory Director's Executive team approved $300,000 for a Year 2000 facilities survey.

The Facility Management Council (FMC) requested an institutional, systematic approach to identifying potential problems for Laboratory facilities that might result from the Year 2000 date rollover. A process was established and funding identified to hire an architectural/engineering firm to perform an embedded-systems survey for our high-priority facilities. The survey is scheduled to start in August and to be completed in the fall of 1998. The consequences of system failure could range from safety and environmental problems to equipment and facility damage (such as frozen coils or pipes and water damage) to date-stamping errors for monitoring and data-collection systems.

As can be seen from these FY97/98 highlights, the awareness, assessment, and repair efforts for Year 2000 are well underway at the Laboratory. Some of the Lab's computer systems are ready, others are being retired, and still others need to be repaired. With continued cooperation, diligence, and adequate funding, the Laboratory will "roll over" smoothly into the next century.

Records Inventory

The Information and Records Management Group began implementing the Lab-wide records inventory initiative in FY98. Success is measured according to the schedule, deliverables, and performance measures described in the five-year Records Inventory Project Implementation Plan given to DOE and UC in July 1997.

The group's short-term objective is to complete the records inventory by the end of FY2002. The long-term objective is to use the information gained from the records inventory and to develop retention schedules in order to develop a Laboratory-wide Records Information Program. Figure 1.3-2 depicts the group's three-tier plan. The first tier is the foundation piece that is built from the information gained during the inventory and from the development of retention schedules. The second tier represents information provided to program and division offices to enable them to establish effective IM programs for their organizations. The third tier shows that establishing a consistent and effective program in each organization will establish a cohesive IM program throughout the Laboratory.

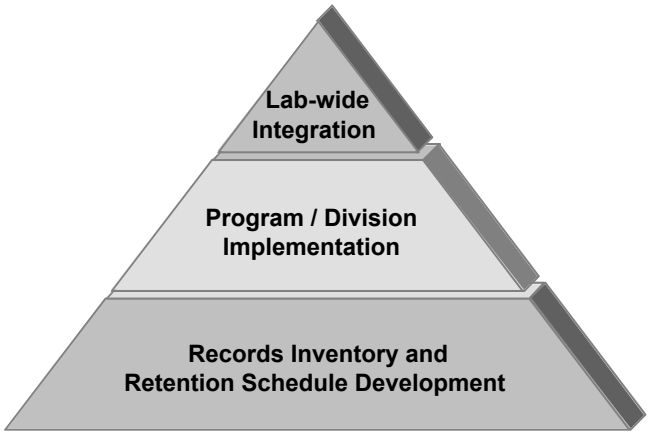


Figure 1.3-2. Three-tier process for the Records Inventory Project.

Through the end of FY98, the Records Inventory team has far exceeded expectations based on its 43% cumulative completion percentage (see Table 1.3-1). The project's performance goals were calculated using an average of 11 cu.ft. of records per employee per organization, as reflected in the employee database in July 1997 when the 5-year plan was developed. The calculations are as follows:

Lab population in July 1997 = 9945 employees
Volume of records projected for Lab = 9945 x 11 cu.ft. = 109,935 cu.ft.

Baseline for records inventory completed between FY95 and FY97:
2091 employees x 11 cu.ft. = 23,000 cu.ft., or 21% of Lab records

FY98 projected completion: 1610 employees x 11 cu.ft. = 17,710 cu.ft.

FY98 inventory = 2163 employees x 11 cu.ft. = 23,793 cu.ft.
+ Baseline = 2091 employees x 11 cu.ft. = 23,000 cu.ft.
FY98 total = 4254 employees x 11 cu.ft. = 46,794 cu.ft.

The total of 46,794 cu.ft. = 43% of the Lab's projected record volume (109,935 cu.ft.).

Table 1.3-1: Records Inventory Performance Goals for FY98

Needs Improvement	Meets Expectations	Exceeds Expectations	Far Exceeds Expectations
<31%	31–36%	>36-41%	>41%

Customer satisfaction with the team's work has been high. Figure 1.3-3 provides data from surveys given to records inventory customers (13 of 26 customers responded). In the surveys, customers were asked five questions:

- Were you satisfied with the explanation/purpose of the inventory?
- Were you satisfied with the individual's professional demeanor?
- Were you satisfied with the inventory form and its contents?
- Were you satisfied with how you were kept appraised of the inventory's status?
- Were inventory forms completed to your satisfaction in a timely fashion?

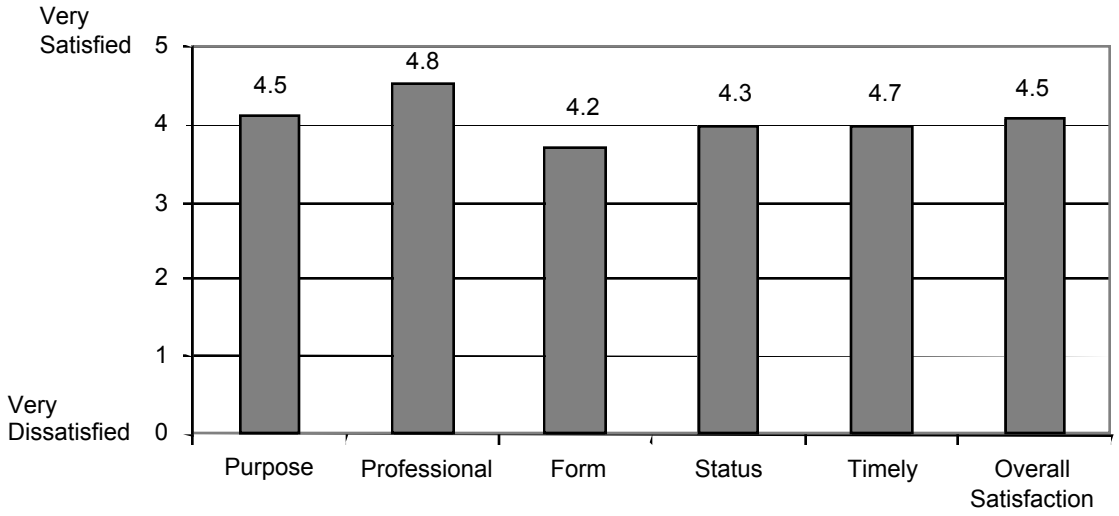


Figure 1.3-3. Customer satisfaction with the Records Inventory.

As the survey indicates, our team has been doing a good job; however, survey comments indicate that the greatest value-added feature of the inventory is an understanding of what records to keep and for how long. We are therefore working on our records retention schedule, an adjunct feature to the records inventory, in order to provide customers with that important information. Also, although we consider a 50% survey response to be very high, we are looking for ways to increase this response rate.

Another indication of the success of the inventory is that several organizations have called to get on our schedule earlier than originally projected. We are meeting these requests whenever possible, but we can only accommodate a few changes because of our limited resources. Our schedule is holding quite well despite the fact that we have had to make changes to accommodate customer requests. For example, CST Division asked to have its inventory postponed because of its reorganization. LANSCE, on the other hand, asked us to move up its inventory.

In addition to having made good progress in the records inventory and to having received high marks from our customers, our team has also

- succeeded as a self-directed work team, defining roles and responsibilities,
- developed a training program that includes cross-training,
- defined a consistent process for the inventory,
- provided inventory database access to customers, and
- improved in knowledge, experience, and confidence, as evidenced by the statistics for FY98.

Printing and Publishing

Appendix G of the UC/DOE contract requires the Laboratory to comply with DOE Order 1340.1B, which details DOE's program to manage printing and publishing activities in accordance with Title 44 of the US Code. Title 44 authorizes the Congressional Joint Committee on Printing (JCP) to establish policies and procedures and identifies the Government Printing Office (GPO) as the primary acquisition and procurement conduit for federal publications. The GPO is responsible for

1. collecting and disseminating published information to the Federal Depository Libraries and
2. obtaining printing and duplicating services on behalf of the government in a cost-effective manner.

The JCP authorizes in-house print plants within every federal agency. Because of the need to print classified and administratively sensitive information and to provide quicker turnaround times for printing than can be procured through the GPO, the Laboratory operates one of these authorized in-house print plants.

The JCP and DOE Order 1340.1B specify the nature of the work to be conducted in an in-house print plant and also specify that as much of the Laboratory's printing as practically possible be vended to the private sector. The Laboratory vends approximately 80% of its printing work to private firms through the procedures established by the GPO. The Laboratory's printing procurement office operates within Region 8 of the GPO, using the Denver GPO office as the point of origin for printing contracts with the private sector. The JCP also provides the Government Printing and Binding Regulations, which supply guidance on operating printing services within the government.

Compliance Requirements

Because of the regulated printing environment specified by the JCP and DOE guidance, the Laboratory must report each year on its printing activities. The Laboratory's annual printing and publishing report is filed with DOE headquarters through the Albuquerque Area Office and becomes part of DOE's complete report to the JCP. Our annual report contains the following information:

- Narrative discussion of the Laboratory's
  - Mission
  - Accomplishments
  - Printing environment
  - Publications
  - User fee programs
  - Procedures for notifying the superintendent of documents about publications
  - Environmentally sound printing and copying services
- Equipment acquired during the fiscal year
- Report of JCP-approved equipment
- Budget projections (for past, present, and next fiscal years plus two years out)
- Production projections (for past, present, and next fiscal years plus two years out)
- New equipment justification
- New technology application
- Projected publishing activities (for past, present, and next fiscal years plus two years out)
- Journal publishing activities (for past, present, and next fiscal years plus two years out)
- Printing plant report
- Commercial printing report
- Annual plant inventory
- Duplicating facility report
- Regional printing procurement office usage report
- Federal Prison Industries (UNICOR) usage report
- Convenience copying activities report

FY98 Compliance and Progress

The Laboratory's annual printing and publishing report was submitted to DOE on December 10, 1997. This report covered the previous fiscal year (FY97) and showed improving trends in print plant operating costs (see Fig. 1.3-4), in costs per 1000 units of production (see Fig. 1.3-5), and in the general level of in-house printing activity. These improvements can be attributed to the efforts that were begun in FY97 to streamline printing operations.

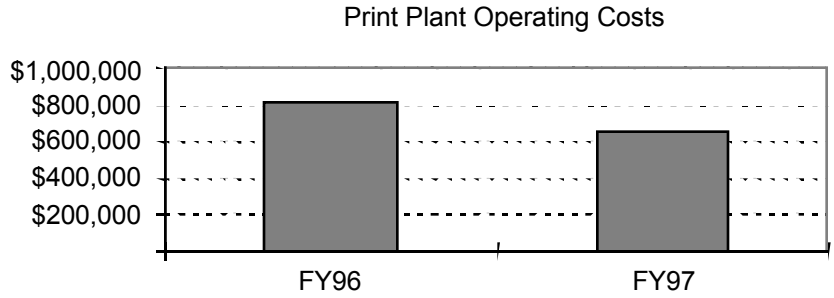


Figure 1.3-4. Operating costs for the Lab's print plant were reduced in FY97.

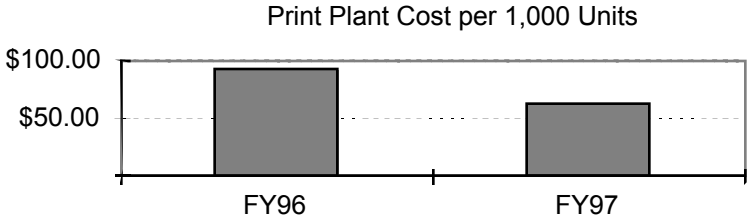


Figure 1.3-5. The cost per 1,000 units for the Lab's print plant was reduced in FY97.

In FY98, additional steps have been taken to continue to lower our operating costs. We vacated our previously separate space devoted to duplicating work, collocating the equipment and personnel within the print plant to provide a single site for customers who need printing, duplicating, and GPO services. Furthermore, we combined supervision of our government-regulated printing activities with that of our administrative and output activities for the Central Computing Facility (CCF) to achieve greater cost efficiencies. The combined print plant and CCF output teams have engaged in cross-functional training and work assignments. During FY98, the total cost of operating our JCP-regulated printing and duplicating activities has been reduced from $1.1M to $1.0M.

During FY98, we further integrated our printing and duplicating activities through electronic network and equipment enhancements to bring about a 100% electronic printing environment. Platemaking and lithographic printing operations have been completely discontinued, eliminating a chemical waste stream and its attendant ES&H requirements.

Because of the movement away from traditional lithographic printing processes, we are now reevaluating the need to continue to operate a JCP-authorized print plant. Like other DOE sites, the Laboratory will very likely be able to downgrade its print plant to a duplicating facility, thus eliminating some reporting requirements and further reducing costs.

Baldrige Internal Assessment Process

In 1996, we conducted our first internal assessment of division activities by measuring them against the Malcolm Baldrige National Quality Award criteria for performance excellence. In 1997, we improved and repeated this assessment process.

The CIC customers and employees who participated in our first internal assessment indicated that it was difficult to correlate division activities with the seven Baldrige criteria. In response to this feedback and using Mark Graham Brown's book *Award Winning Quality* as a guide, we compiled the CIC 1998 Quality Assessment Document (LA-UR-97-5001). This document correlated division activities with the seven criteria and became the basis for our second Baldrige assessment.

For this second assessment, we again recruited 36 CIC customers and employees. Two-thirds of them had participated in the first assessment. New participants received a 4-hour tutorial that explained the Baldrige criteria and the requisite examination skills; for returning examiners, this training was streamlined to a 90-minute refresher class. As in 1996, CIC division leaders conducted a parallel assessment for comparison purposes.

Figure 1.3-6 compares the division's scores on all seven criteria from the two customer/employee assessements. There are seven major categories in the Baldrige Assessment and each category contains two or more items. The major categories are: 1. Leadership, 2. Strategic Planning, 3. Customer and Market Focus, 4. Information and Analysis, 5. Human Resource Focus, 6. Process Management, and 7. Business Results. Because some criteria changed from 1996 to 1997, an exact comparision is difficult; however, the division's overall score improved: we received a total of 266 points in the second assessment, compared with 190 points in the first. Our 1997 score indicates that the division has in place the beginning of a systematic approach to meeting the Baldrige criteria but still has some gaps in fully satisfying those criteria.

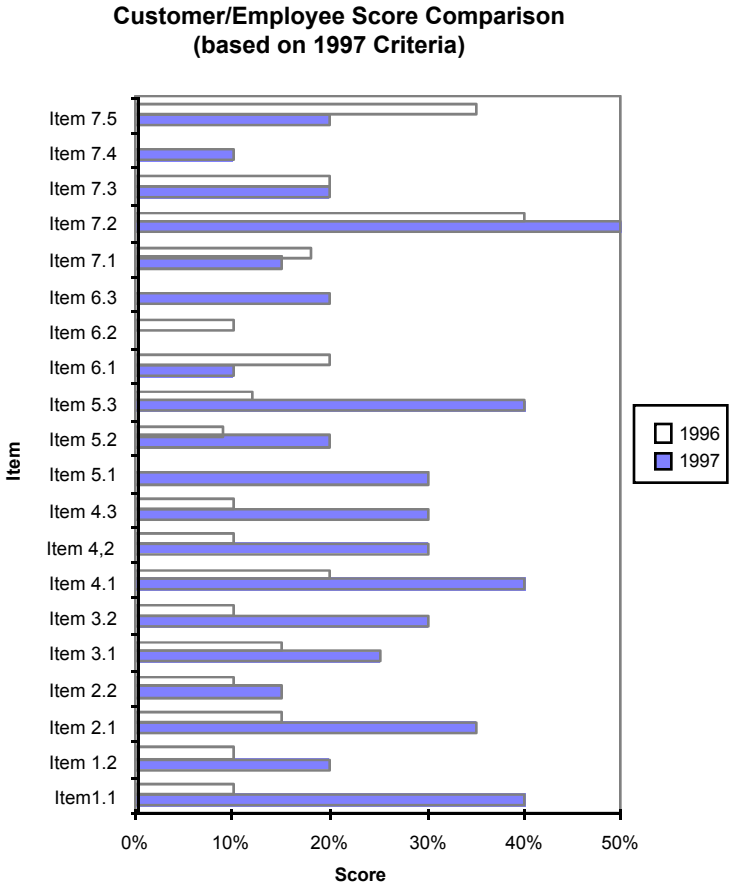


Figure 1.3-6. Comparison of 1996 and 1997 scores from the division's Baldrige assessments.

The separate assessment completed by the CIC leaders compared well with that of our customer/employee team. In addition, we received further feedback from a Baldrige-trained consultant who independently assessed division activities. Her scores and comments validated those of our own two internal assessments and gave us a third perspective on division performance as measured against the Baldrige criteria. Results from these assessments were used as input to the division's strategic planning activities, which are a part of the Integrated Management Process described under Criterion 1.4.

Research Library's Quality New Mexico Award

In FY98, the Research Library (CIC-14) received the Quality New Mexico Roadrunner award, becoming the only library ever recognized for this level of excellence. The Quality New Mexico program recognizes organizations that excel in using quality concepts and principles. The examiners for the award wrote: "The LANL Research Library has integrated a strong customer focus with visionary planning and uses a well-defined process, Strategic Business Management, for managing their business. They are demonstrating strong results from their advancements in a number of areas." Among other accomplishments, the examiners noted the Library's strong leadership and customer interest as well as significant gains in productivity and supplier responsiveness.

Mark Graham Brown Collaboration

In October 1997, CIC managers and the division's Operations Focus Team hosted Mark Graham Brown for a four-day visit that included training on how to develop meaningful performance measures. Mr. Brown is a leading national expert on quality, on the Baldrige assessment process, and on performance measurement. He has published over 50 articles and has written the authoritative book on how to interpret the criteria for the Malcolm Baldrige National Quality Award. He has also authored a book on why total quality management fails in most companies. Mr. Brown has been an examiner for the Malcolm Baldrige National Quality Award since 1990 and has conducted numerous workshops on how to use the criteria to establish quality improvement plans.

The first day of Mr. Brown's visit was devoted to a course that focused on developing performance measures and was based on his book *Keeping Score*. The second and third days were devoted to meetings with individual CIC leaders in which Mr. Brown discussed the specific performance measures most suitable for their groups or projects. On his last day, Mr. Brown met with CIC leaders for a summary and close-out session. As a result of his visit, almost every group in the division now has balanced performance measures in place that are derived from CIC's strategic plan. These balanced measures look at the entire organization—at financial, customer, and internal business processes as well as at human resource measures. During his visit, Mr. Brown also presented a lecture open to all Laboratory staff on organizational effectiveness and the use of measures to evaluate quality.

Information Sharing

The Laboratory actively participates in two forums for sharing information on IM issues—DOE's Information Resources Management Division (IRMD) Conferences and UC's Joint Operations Group (JOG). These two forums give us the opportunity to share best practices and lessons learned in the IM arena with other DOE sites and with UC campuses. They also provide an opportunity to learn from others and benchmark our products and services.

In FY98 we participated in two IRMD Conferences hosted by the Albuquerque Operations Office. The leader of the CIC Division Quality Office, Kay Fletcher, facilited both meetings, which brought together people from various DOE sites interested in sharing information on such IM issues as

- protocols for electronic communications,
- resource retention,
- networks,
- equipment leasing,
- make/buy/lease analyses,
- help desks, and
- hardware/software standardization.

IRMD meetings are scheduled quarterly and provide the means for establishing cooperative partnerships among participating sites. For FY99, conference participants plan to develop an inventory of skills as the basis for possibly sharing resources between sites.

Since June 1992, the Laboratory has also participated in UC's Joint Operations Group. The group is convened by UC's Associate Vice-President for Information Resources and Communications and is composed of his counterparts from each UC campus and laboratory. The JOG serves as the coordination and review mechanism for planning activities related to information systems. Members review and assess the University Information Systems Plan and establish standards for systems development and operations at the University. The JOG meets on a quarterly basis, and members are responsible for

- needs assessment,
- preparation of campus/laboratory information systems plans,
- adherence to uniform data definitions and agreed-upon standards for systems development,
- local development and maintenance of systems,
- resource planning, and
- compliance with University-wide information systems plans.

The Laboratory's JOG representative is Nicholas Nagy of the CIC Division Office; his latest presentations to the group are available on the Web (http://www.lanl.gov/cic/jog/).

Performance Assessment

CIC Division has established a very effective system (the Integrated Management Process) to provide internal controls and meet compliance requirements (see Criterion 1.4). To recap our accomplishments:

- We had no noncompliance issues in the IM area during FY98.
- We have an active Year 2000 readiness program in place to ensure that our IM systems are ready for the next century.
- We have made great strides in our Records Inventory Project—through the end of FY98, the inventory team's 43% cumulative completion percentage far exceeds expectations.
- In the printing and publishing area, we have demonstrated improving trends in print plant operating costs and in the level of in-house printing activity.
- During FY98, we completed our second Baldrige quality assessment, and we have made this exercise an annual event. Eventually, we plan to submit our assessment to the National Malcolm Baldrige Assessment committee. To work towards this goal, we had a nationally recognized expert on performance measures, Mark Graham Brown, train CIC managers to better analyze and to improve our quality assurance efforts.
- The Research Library won a Quality New Mexico Roadrunner award—the only library ever recognized with this award.

Given this progress, we submit that our efforts to ensure effective internal controls and compliance more than satisfy the requirements of the "outstanding" gradient.

Criterion 1.4—Strategic and Tactical Planning

IM plans and practices are aligned with Laboratory strategic and tactical requirements. (Weight = 20%)

Performance Measure 1.4—Planning Initiatives

Evaluation of evidence that IM is aligned with the Laboratory's mission. (Weight = 20%)

Assumptions

Measurement deliverable—IM plans or descriptions of IM initiatives that support the mission and plans of the Laboratory. Reference may be made to accessible work products or other existing Laboratory documentation.

Gradients

Good—planning, evidenced by documentation, that effectively supports the Laboratory's missions

Excellent—a planning process exists that drives IM practices to align with the Laboratory's missions.

Outstanding—evidence that the IM planning process can adapt to changing conditions, uses sophisticated methods or planning tools, and has received external recognition of excellence.

Performance Measure Results

FY98 marks the third year that we have utilized our Integrated Management Process (IMP). This successful management strategy continues to forge the necessary links between CIC operations and the Laboratory's mission and goals (see Fig. 1.4-1). Each major phase in the IMP—strategic planning, business planning, operations, and assessment—complements and reinforces the others in a continuous system that ultimately cascades Laboratory goals to the level of individual performance objectives.

The IMP provides continuity in the face of organizational change. While its subprocesses may evolve according to the vision and style of the CIC director and top managers, the principles of long-range and business planning, total quality management, performance measurement, customer focus, and organizational learning upon which the IMP was founded will endure. In the following description of IM performance measure results, we focus on IMP accomplishments during FY98 related to the following activities:

- Strategic planning process
- Business planning process
- Performance measures
- Performance appraisal process

We also note the challenge posed this past fiscal year by Laboratory and CIC Division restructuring.

Figure 1.4-1. The Integrated Management Process (IMP) for CIC Division.

Strategic Planning Process

The FY98 strategic planning process (Fig. 1.4-2) was similar to that of the previous year in that a variety of inputs were used to check the continuing validity of our FY98 strategic and tactical goals. Five focus teams—Customer Relationships, Workforce, Information Management, High-Performance Computing, and Communication Products—were tasked with reviewing and revising the division's strategic and tactical goals to ensure that they were aligned with the Laboratory's goals. The teams' recommendations were reviewed by the CIC leadership team during its May 19 Strategic Planning Workshop. After this workshop, the focus teams finalized their goals and recommended supporting tactics to be included in the business plans of the division's groups, projects, and teams.

Tables 1.4-1 through 1.4-5 show how the teams' final FY1999–FY2000 strategic and tactical goals for the division are aligned with Laboratory goals. CIC's strategic and tactical goals have been documented in the strategic plan for FY99 and posted on the Web. They have also been communicated to CIC employees through group, project, and team meetings.

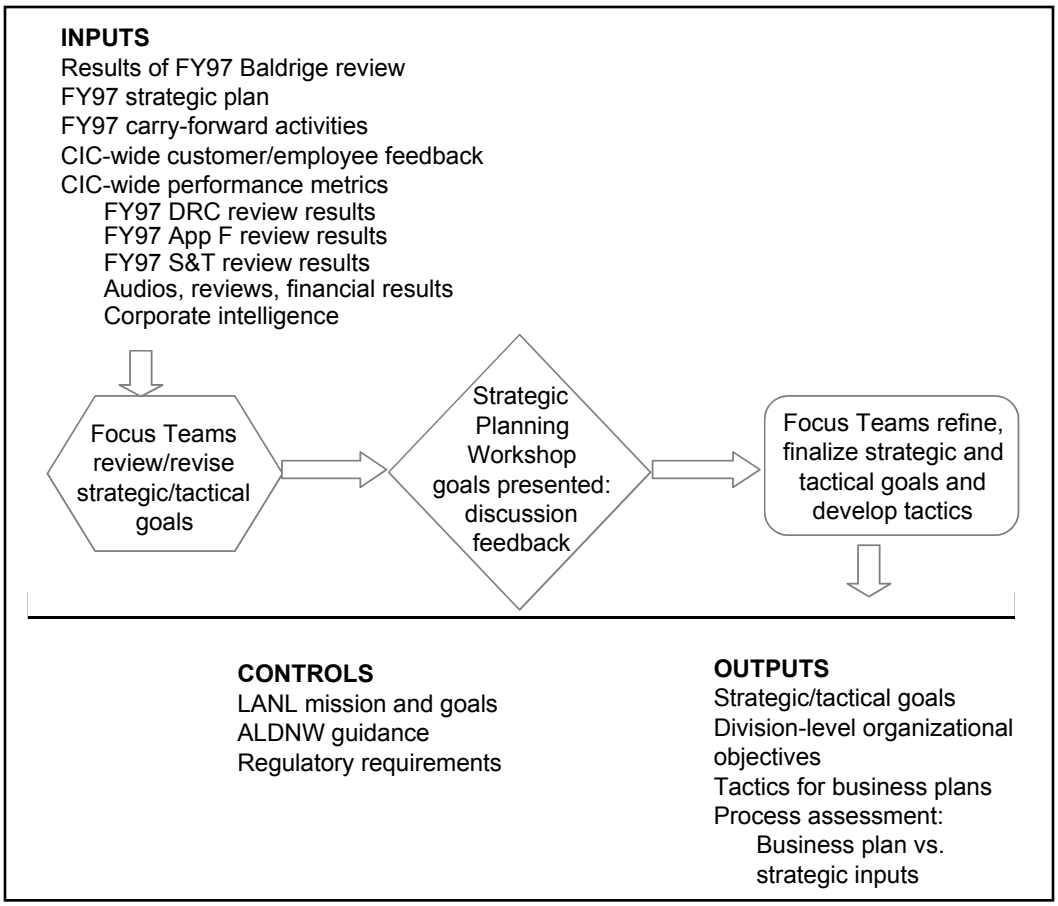


Figure 1.4-2. FY98 IM strategic planning process.

Table 1.4-1: Customer Relationships Focus Team Goals

Laboratory Strategic Direction	Continually improve the productivity of the Laboratory and strengthen our programmatic funding.
Laboratory Tactical Goal	Increase the value to customers of our programs and competencies.
CIC Strategic Direction	Establish customer relationships as the foundation of CIC culture. These relationships are characterized by mutual understanding, trust, inclusion and accountability, leading to effective partnerships.
CIC Tactical Goals	1. Profile current customers. 2. Identify and document current customer interaction processes. 3. Develop and implement consistent models for customer interactions across the Division. 4. Promote customer involvement throughout the entire product/service life cycle.

Table 1.4-2: Workforce Focus Team Goals

Laboratory Strategic Direction	1. Continually improve the productivity of the Laboratory and strengthen our programmatic funding. 2. The diversity of our workforce and surrounding communities serves as a competitive advantage as the Laboratory pursues its institutional vision.
Laboratory Tactical Goals	1. Improve the productivity of internal Laboratory processes. 2. Enhance workforce diversity in the technical staff member and manager categories.
CIC Strategic Direction	Foster a workplace environment that promotes an involved and enthusiastic workforce through collaboration and communication.
CIC Tactical Goals	1. Employ a consistent process across the division for performance appraisals and salary management. 2. Create a work environment that will attract and retain a highly qualified and diverse workforce to meet the division's future needs. 3. Improve communication across the division to ensure a knowledgeable, participating, and valued workforce.

Table 1.4-3: Information Management Focus Team Goals

Laboratory Strategic Direction	Continually improve the productivity of the Laboratory and strengthen our programmatic funding.
Laboratory Tactical Goals	1. Improve the productivity of internal Laboratory processes. 2. Increase the value to customers of our programs and competencies. 3. Assess and develop opportunities for Laboratory work consistent with our national mission.
CIC Strategic Direction	Be leaders in information management by providing our customers with the right information at the right time through a standard Information Architecture.
CIC Tactical Goals	1. Optimize the use and value of information via the electronic workplace. 2. Maximize the use of commercially available products. 3. Provide stewardship of the Laboratory's records. 4. Ensure Year 2000 compliance.

Table 1.4-4: High-Performance Computing Focus Team Goals

Laboratory Strategic Direction	1. Demonstrate to DoD and DOE that an integrated, science-based approach to stockpile stewardship and management will allow us to predict and respond to, without nuclear testing, issues of safety, reliability, and performance of the aging nuclear stockpile. 2. Create the world's best computing environment to help solve critical problems in science and technology through predictive modeling and simulation.
Laboratory Tactical Goals	1. Develop the ability to certify the safety, reliability, and performance of nuclear weapons that have changed because of age or remanufacture. Use all of the Laboratory's technical capabilities, from basic research through process engineering, while concentrating this year on radiography, advanced computing, enhanced surveillance, and integrated manufacturing. 2. Build the Partnership for Advanced Computing to define the leading edge of computing and use it to enable science-based stockpile stewardship (SBSS) and global climate studies.
CIC Strategic Direction	Increase the Laboratory's role and effectiveness in modeling and simulating complex problems of national importance by providing the computing environment necessary to meet these challenges.
CIC Tactical Goals	1. Enhance current technology and develop new areas of research in computational science that target the advancement and improvement of LANL's high-performance computing environment aligned with the ASCI and Delphi programs. 2. Build a balanced infrastructure for computing, storage, networking, visualization, and output that meets user requirements, protects information assets, and supports the ASCI/Delphi curves toward a 100-teraOp capability. 3. Engage current and new programmatically aligned customers in solving problems of national importance utilizing an advanced HPC environment that balances leading-edge technology and focused production scientific computing systems. 4. Develop an integrated, long-term training program focused on the necessary skill set for 100-teraOp simulation and modeling. 5. (Minor) Deploy cost-effective high-performance computing solutions throughout the Laboratory.

Table 1.4-5: Communication Products Focus Team Goals

Laboratory Strategic Direction	Continually improve the productivity of the Laboratory and strengthen our programmatic funding
Laboratory Tactical Goals	1. Improve the productivity of internal Laboratory processes. 2. Increase the value to customers of our programs and competencies. 3. Assess and develop opportunities for Laboratory work consistent with our national mission.
CIC Strategic Direction	Lead communication efforts that strengthen understanding and support for the Laboratory's contribution to the nation.
CIC Tactical Goals	1. Demonstrate that our current portfolio achieves positive results for customers. 2. Expand our portfolio using contemporary and creative tools, techniques, and strategies that respond to customer needs. 3. Expand and deepen staff skills. 4. Reengineer processes in response to customer needs.

Business Planning Process

Figure 1.4-3 is a schematic of the FY98 business planning process. Business plans for the next fiscal year are being developed at this time; finalized plans are due to the CIC director by September 18. Peer reviews on the plans are presently scheduled for late September.

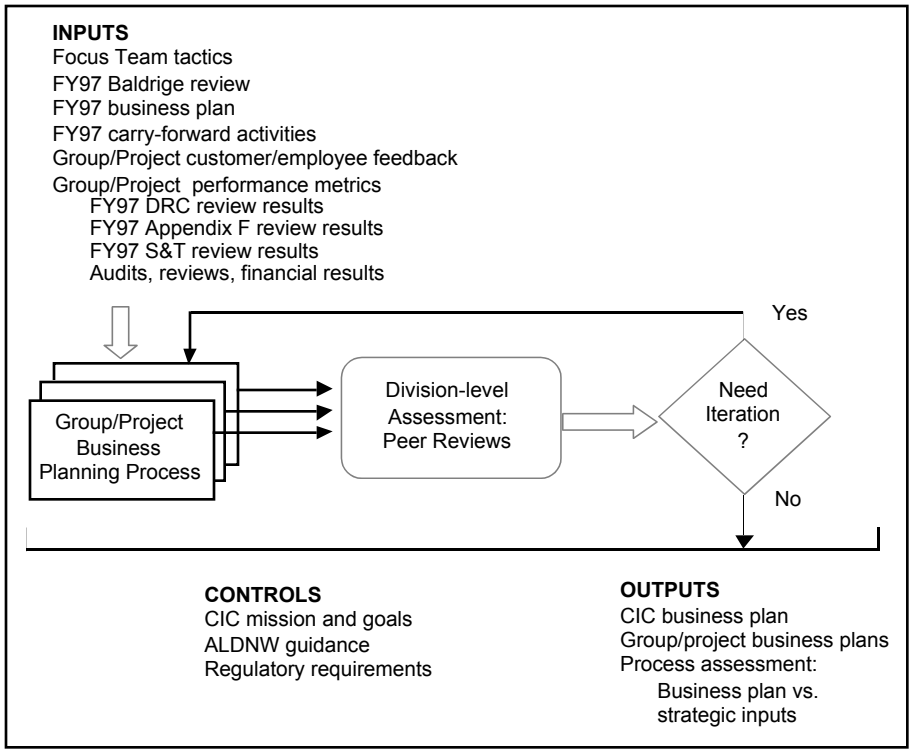


Fig. 1.4-3. FY98 IM business planning process.

Business plans submitted by division organizations contain the following information:

1. Vision
2. Mission
3. Goals
4. Links to LANL and CIC strategic/tactical goals
5. Tactics for FY1999–FY2000
6. Milestones and deliverables
7. Resource requirements, including FTEs and operating/capital budgets
8. Performance measures

Beginning with FY99 business plans, the CIC division director has requested that groups and projects use project management software to establish and monitor schedules. All division organizations have been asked to express fiscal year milestones in terms of a Gantt chart, showing the linkages between tasks and their dependencies. MicroSoft Project has been chosen as the standard software, in keeping with its choice by DOE for the ASCI project. The ASCI project applied a project management approach to scheduling during FY98. It is presently experimenting with Web tools to develop a prototype system that will enable the project to update its MicroSoft Project database via the Web during FY99. The experience gained with this prototype will help us develop a Web-based project management system for the division as a whole.

Performance Measures

Early in FY98, Mark Graham Brown met with CIC leaders and trained them in developing performance measures. Mr. Brown is an experienced Baldrige examiner and a nationally recognized expert on performance measurement. Following this training, our leaders developed performance measures and data collection plans for their individual organizations. They were asked to begin by addressing issues involving our workforce, customer relations, and financial performance and to consider addressing innovation and the performance of our suppliers. A review team provided feedback and suggestions on improving these initial measures, which were then revised. The revised measures will be reviewed and approved by the new CIC deputy directors and then implemented during FY99.

The leaders who developed group-level performance measures for our workforce, customer relations, and financial performance were also asked to develop division-wide performance measures in these categories. The division measures will form the initial set of the division's FY99 "dashboard"—metrics designed to help CIC's director keep up with progress or slippage in the division's performance on key measures. Mr. Brown will be invited back to review these performance measures and to assist in developing similar dashboard metrics for innovation and supplier performance.

Performance Appraisal Process

During FY98, the Laboratory has developed and implemented a new performance appraisal process that calls for managers to provide employees with organizational performance objectives. Employees are then expected to develop performance objectives for themselves that further those of the organization. The individualized performance objectives agreed upon between employees and their supervisors will provide the standard against which employees' performance will be measured at the end of the year. Since CIC's organizational objectives are already linked to Laboratory strategic and tactical goals through the IMP, when employee performance objectives are linked to CIC's organizational objectives, individual performance in CIC Division will be tied to the Laboratory's mission and goals. The IMP will ensure that the desired cascading of goals and objectives is realized in CIC Division (see Fig. 1.4-4).

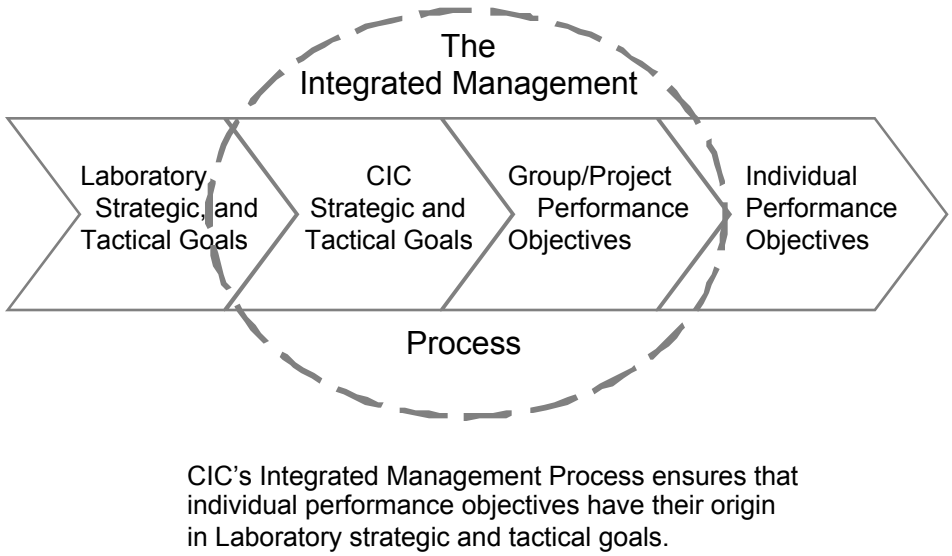


Figure 1.4-4. In the Lab's new performance appraisal system, employees' performance objectives will be tied to Laboratory goals.

Possible Barriers to Improvement

The Laboratory is still an organization in transition. The new Laboratory Director, John Browne, is in the process of restructuring and staffing his top management. Under the new structure, CIC reports to an Associate Laboratory Director, Stephen Younger, who is also in the process of restructuring and staffing his organization. Finally, restructuring is also underway in our own division. We have a new Division Director, Charles Slocomb, who has established and is now filling three new deputy positions for the division. He has selected John Morrison as the new Deputy Director for Strategic Computing; the other two positions, Deputy Director for Research and Deputy Director for Information Services, are in the process of being staffed. Because the CIC director has embraced the IMP and its key components of performance measurement and project management as outlined above, however, the impacts of organizational change will be less than they would be without this stabilizing management approach. Still, we are operating in a period of change.

Performance Assessment

CIC Division is the only Laboratory division that combines strategic and business planning, total quality management, performance measurement, and project management into a single Integrated Management Process. We have fully implemented the IMP and continue to improve its processes. Our new emphasis on the use of project management software should ensure that work deliverables are completed on time and within budget. This software is being used for projects throughout the division and will be implemented during FY99. We have also implemented the Resource Planning Module (developed last fiscal year) for financial planning and tracking. Work underway to develop a division "dashboard" will enable the CIC director to monitor division performance in terms of key metrics.

The IMP has provided continuity and stability during a period of organizational change both within the Laboratory and the division. As described above, activities under the major IMP phases—strategic planning, business planning, operations, and assessment—continue to flourish within CIC Division. The IMP has also received external recognition of its excellence. In the FY97 Appendix F assessment

process, the Laboratory's IM program received the highest score ever and the highest score among UC laboratories for the planning category. Los Alamos was invited to describe the IMP to the UC Joint Operations Group and to DOE and UC laboratory representatives.

Given our past and continuing success with the IMP, we feel that our strategic and tactical planning program measures up to the requirements for the "outstanding" gradient.

Self Assessment For: Information Management
Office of Primary Responsibility:
Approved By: _____ _____ Charles Slocomb, Division Director Date _____ _____ Nicholas Nagy, Functional Manager Date